

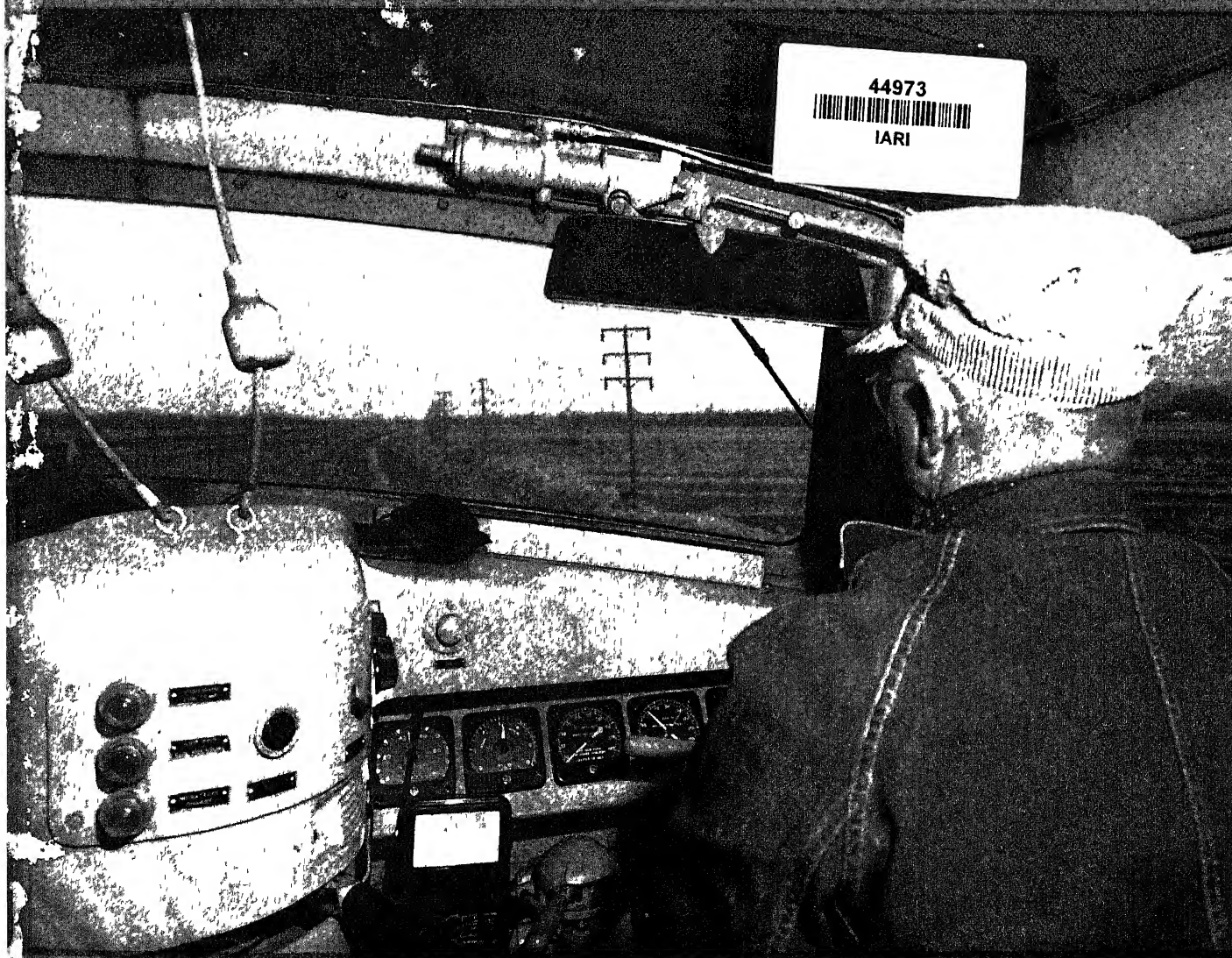
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JULY 2, 1949

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



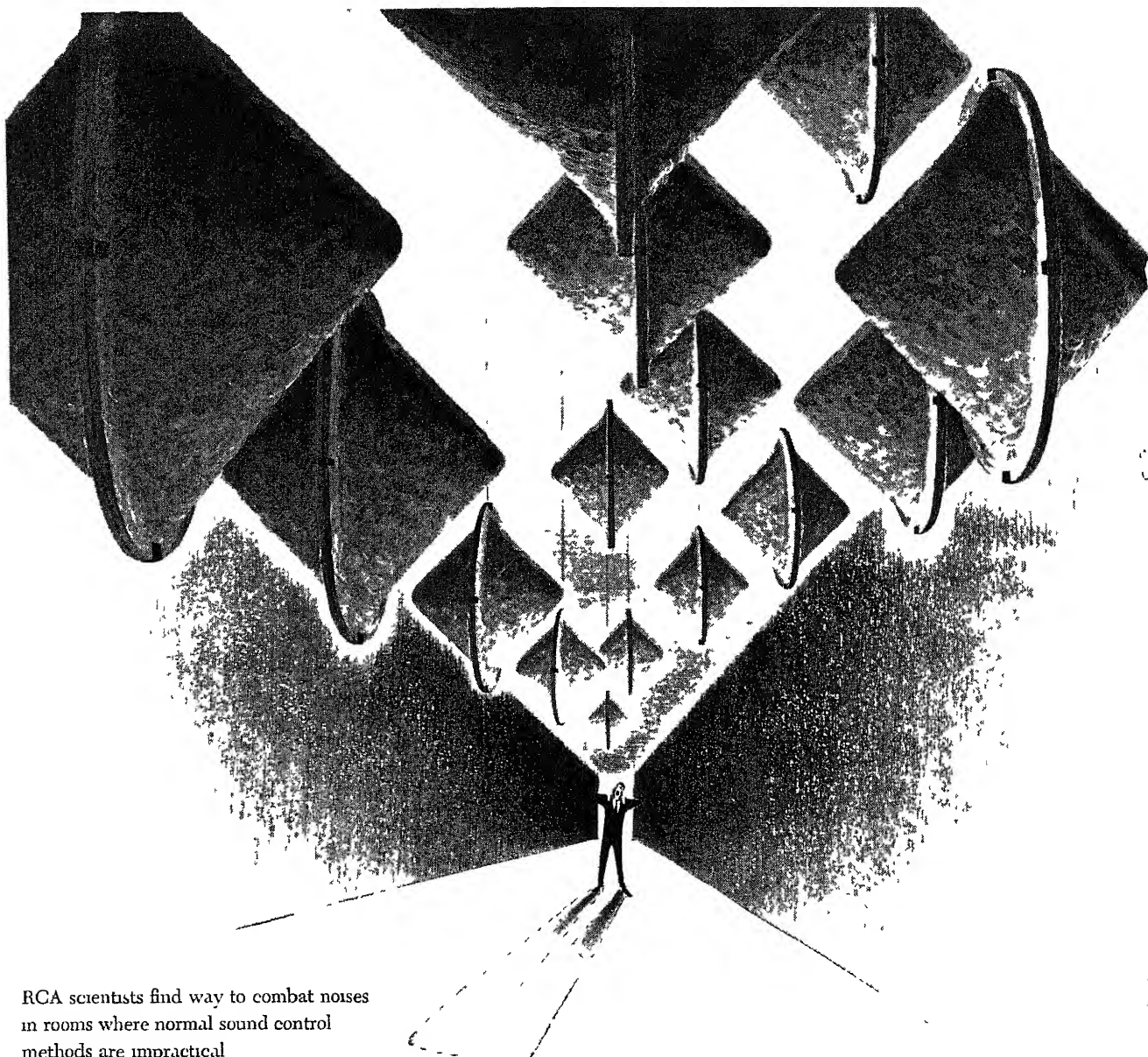
First in U. S.

See Page 6

A SCIENCE SERVICE PUBLICATION

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VOL. 56, PAGES 1-16



RCA scientists find way to combat noises in rooms where normal sound control methods are impractical

These "Cones of Silence" smother sound!

You think of RCA Laboratories—in part—as a place where scientists work with *sound*, for radio, television, phonographs. This is true, but they are also deeply concerned with *silence*.

One example is a recent RCA development, a way of killing clatter in places where conventional sound-conditioning—with walls or ceilings of absorbent materials—would get in your way. Overhead pipes, ducts or

other fixtures might prevent the installation of a sound-absorbent ceiling—and you wouldn't want to blanket a skylight.

RCA's invention solves the problem in this way. Cones of sound-absorbent substances are clamped together base-to-base . . . then hung in rows where not in the way. Light, inexpensive, easy to install, these "Cones of Silence" convert sound waves into heat energy, and will absorb from 60% to 75% of the clatter in a noisy room.

How you benefit:

Development of this functional sound absorber indicates the type of progressive research conducted at RCA Laboratories. Such leadership in science and engineering adds *value beyond price* to any product or service of RCA and RCA Victor.

The newest developments in radio, television, and electronics can be seen in action at RCA Exhibition Hall, 36 West 49th St., N. Y. Admission is free. Radio Corporation of America, Radio City, N. Y. 20.



RADIO CORPORATION of AMERICA
World Leader in Radio — First in Television

NUCLEAR PHYSICS

Heavy Nuclei Bombard Us

Discovery of heavy particles at 18 to 20 miles above the earth was reported. Existence of heavy nuclei as well as protons in cosmic rays was demonstrated.

► THE earth is being bombarded with very heavy stuff, atomically speaking

Nearly a third of the total mass of the projectiles in the cosmic rays from outer space consist of stripped-down hearts of heavy atoms, the University of Denver International Cosmic Ray Symposium was told in Idaho Springs, Colo. Discovery of the heavy particles at 18 to 20 miles aloft is the top news being discussed

Two teams of scientists, one at the University of Minnesota and the other at the University of Rochester, have demonstrated that the heavy nuclei really do exist in the mysterious cosmic rays that come in from outer space. Before it was thought that they were exclusively protons, positive particles that are also one of the building blocks in atomic hearts

Dr. Frank Oppenheimer, who has just resigned his professorship at the University of Minnesota after having told a Congressional committee of his experiments in communistic theory over a decade ago, is the leader of the Minnesota group reporting to the symposium which is sponsored by the Atomic Energy Commission and the Office of Naval Research among others. Dr. Edward Ney, also there, Dr. George and Phyllis Frier, a husband and wife team, and Dr. E. J. Lofgren were in the Minnesota group

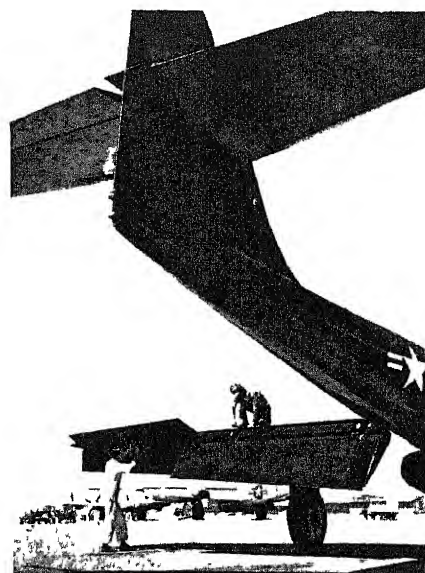
The Rochester experimenters are Drs. H. L. Bradt and Bernard Peters

This spring the Navy aircraft carrier *Saipan* on a mission to the Caribbean launched balloons to high altitudes to see if the heavy particles came into the earth's atmosphere at the earth's magnetic equator as plentifully as they do farther north

The heavy particles are believed to be the central mass of chemical elements, stripped of their electrons, ranging from carbon to molybdenum. They plunge toward the earth with energies that are a hundred billion electron volts, which means that the elementary particles that they carry (protons and neutrons) each have few billion electron volts. These energies are much higher than those that man with his cyclotrons has been able to create and impress upon particles here on earth

Just now it is a puzzle as to where the particles come from and how they get their energy. That is one of the reasons for the high-powered research upon the cosmic rays. For as they are better understood, the way the universe is put together may be understood better. There may come out of this highly theoretical work with little particles that are here and there knowledge that will give us new methods of control of atomic energy for war or peace

Science News Letter, July 2, 1949



AIR BRAKES—The jaw-like control surfaces shown above at the outer end of the wing trailing edge on a Northrop Scorpion, twin-engine, jet-propelled, all-weather fighting airplane are known as "decelerons" because they combine the functions of ailerons, fighter brakes and landing flaps. In normal flight the jaws are closed. In dives, the jaws are opened to provide effective fighter brakes.

light, spread out into its component wavelengths to give bands of colored light crossed by numerous dark and bright "spectral" lines. These lines can reveal the chemical elements present in the stars

The Wisconsin astronomer said that the new machine will not only give more accurate spectrogram measurements, but it will also be easier on the astronomer. It all but does away with eyestrain and fatigue and eliminates personal judgment, and personal error, plus offering increased speed

With the electronic machine, most of the job is done automatically. The astronomer pushes a button to indicate the spectral lines to be measured, and the reading is recorded for him on photographic film. Previously astronomers have generally examined the faint lines from a star under a microscope. This, particularly in the case of a very hot star, required much practice and many measurements

One major limitation remains the same as for direct eye measurements. This is the grain of the photographic plate on which the spectrum of a star is taken. Scientists can take some steps to get easy-to-measure lines, but sometimes stars make their own spectra with fuzzy lines

Science News Letter, July 2, 1949

MEDICINE

Stomach Cancer Detection

► FIVE "filters" that can help with mass tests for detection of stomach cancer were reported by Dr. David State of Minneapolis to the American Medical Association in Atlantic City

The "filters" were designed to detect stomach cancer before symptoms developed and to determine persons in whom the disease is likely to develop. Instead of X-raying all persons over 50 years old, the age group in which stomach cancer is most likely to develop, the Minneapolis doctor suggests filtering out the most susceptible by tests for pernicious anemia and the stomach's production of acid in response to doses of histamine

None of 79 persons who had a family history of stomach cancer had stomach cancer themselves, X-ray examinations showed. Neither did any of the 72 who were losing such small amounts of blood that it could only be detected by chemi-

cal tests. But of 1,206 whose stomachs failed to produce acid in response to the test, seven were shown to have stomach cancer. So did one of the 178 whose stomachs produced a little but less than the normal amount of acid in the test and three of 94 who had pernicious anemia

Science News Letter, July 2, 1949

ASTRONOMY

Electronics Helps Reveal What Makes Up the Stars

► NEWEST job for electronics is to help astronomers discover what makes up stars.

Harold L. Johnson of the University of Wisconsin's Washburn Observatory described a new electronic plate-measuring machine to the American Astronomical Society in Ottawa, Canada. Plates measured by the machine are photographs of star

ENGINEERING

Checking Metal Corrosion

► THE POOLING of knowledge on metal corrosion and its prevention, gained from scientific research by many men in various parts of the world, is responsible for modern methods now widely applied to give metals in use longer life, the UNSCCUR will be told at its Lake Success meeting this summer by F. L. LaQue of the International Nickel Company, New York. This is the international United Nations Scientific Conference on the Conservation and Utilization of Resources.

The most effective means of preventing corrosion, not including the use of protective coatings such as grease, paint and zinc, will be reviewed by him. They include humidity control, de-aeration, the use of inhibitors, cathodic protection, design and the use of alloying materials.

Since practically all common corrosion processes require the presence of water, or water vapor, it is possible to prevent corrosion by eliminating water, he will say. It has been established that when the relative humidity is kept below 30% corrosion will be negligible. The control of humidity in large spaces can be accomplished by the use of air-conditioning equipment. With packaged apparatus, the air within can be kept dry with the use of a suitable moisture-absorbing substance such as silica gel. When the package is a metal container, the inside air can be replaced with an inert gas such as nitrogen.

De-aeration, or deaeration, includes the removal of atmospheric or other oxygen from the environment. Oxygen plays a part in much corrosion. An example of the application of this process is in the use of a deaerator in the treatment of boiler feed water. It is possible to reduce the oxygen content of water below 0.01 part per million, he will state. Deaeration has also been applied successfully to the prevention of cor-

rosion of steel pipe lines used to carry otherwise corrosive water for long distances.

Inhibitors are defined by him as compounds that stifle either the anodic or cathodic portions of the normal corrosion reaction, or both. Most inhibitors function as chemically or physically absorbed films which either alter the electrochemical characteristics of the metal, or serve as mechanical barriers to the normal corrosion processes. The reaction of various chemical inhibitors will be described by Mr. LaQue.

Cathodic protection, first used in 1824 by Sir Humphrey Davy, is one of the most effective means of preventing or arresting corrosion. It is based on the principle that most corrosion of practical importance is electrochemical in nature and results from the flow of current through an electrolyte between areas of different potential which may exist on the surface of a single metal or between two or more different metals. The solution is to bring all surfaces to the same potential.

This can be accomplished in most cases by introducing a current to offset the one produced by the difference in potential. In Mr. LaQue's language, "by discharging current on the more noble (cathodic) surfaces so as to achieve their cathodic polarization to the potential of the adjacent anodes." By far the most important application of cathodic protection has been in connection with the thousands of miles of underground oil, gas and water pipe lines, and power and communication cables.

Good design for metal structures avoids crevices favorable to corrosive action, or to galvanic action that could cause corrosion. It is bad practice, according to Mr. LaQue, to use threaded connections between dissimilar metals, brazed or welded points are much better.

One of the most effective means of in-

creasing the durability of the elemental metals is to combine them in alloys or to control their minor constituents so as to achieve the corrosion-resisting properties desired. Stainless steel is the most spectacular example. Iron alloyed with chromium and nickel, sometimes supplemented with molybdenum, columbium, titanium, silicon, copper or tungsten added for specific purposes, may have its ability to resist corrosion increased 100,000 times that of ordinary iron.

Science News Letter, July 2, 1949

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ASTRONOMY

What Makes Up a Comet?

Comets are born with hearts of "ices" of gases, a new theory holds. As this solid nucleus approaches the sun, the heat turns it into a huge gaseous cloud.

➤ A COMET is formed from a heart of "ices" of common gases, starting in the outer reaches of the solar system, an astronomer proposed.

Dr Fred L Whipple of Harvard College Observatory suggested that this solid nucleus, or heart, is turned into the huge cloud of gas, which makes up the head of the comet, by heat as it approaches the sun. Dr Whipple's answer to a baffling riddle of the solar system—What is a comet?—was given to the American Astronomical Society meeting in Ottawa, Canada.

The "icy" solid heart from which the comet head is formed would not be large. Its diameter would be four miles, at most, and more likely about a half mile. In addition to water in its solid form, ice, Dr Whipple believes that the solid forms of the gases ammonia, methane, carbon monoxide or carbon dioxide and carbon nitride are in the comet nucleus.

In addition to the "ices," the heart probably contains some bits of solid matter similar to meteors, or shooting stars. And there is a layer or shell of this matter outside the nucleus, through which the evaporation of the "ices" takes place.

The tamed tail of the comet is known to be caused by the pressure of the sun's radiation which sweeps back gases and dust of the comet's head.

To have an "icy" heart, the comet nucleus must begin its lengthy travels far out in the solar system, practically out in interstellar space but still within the gravitational pull of the sun. Some comets are known which probably take millions of years to complete one journey around the sun. Others which have much shorter periods, such as those in planet Jupiter's comet family, may have been captured by the planet's gravitational pull, Dr Whipple explained.

As the comet moves through the solar system, it gives off some of the gases, and this accounts for changes in its path, or orbit. Also lost are some of the bits of meteoric matter which cause the showers of shooting stars when these solid pieces of a comet strike the earth's atmosphere.

Under Dr Whipple's theory, the ovalness, or eccentricity, of a comet's orbit would increase or decrease, depending on whether the comet's rotation was in the same or opposite direction as its path around the sun. If it is the same, the emission of gases would be backward, and the orbit's eccentricity would increase.

Thus, a well-known comet, Encke, has

been observed to be decreasing its eccentricity, so it is believed to be rotating in an opposite direction from its path.

Dr Whipple calculates that this comet has to lose only one five-hundredth of its

AERONAUTICS

Non-Protruding Antennas

➤ SOME of the steps taken by the U S Air Force to eliminate drag on speedy planes caused by protruding radio antennas were revealed at the Wright-Patterson Air Force Base in Dayton, O. Over 600 horsepower is saved for propulsion purposes in some of the larger planes which may have as many as 15 receiving and sending antennas.

The new antennas, of which there are several types, are hidden in the skin of the plane or buried beneath the skin. In addition to being positioned where they cause no drag as protruding antennas do, they are safe from icing, precipitation static, the sealing out of moisture, and danger of breaking off at high speeds.

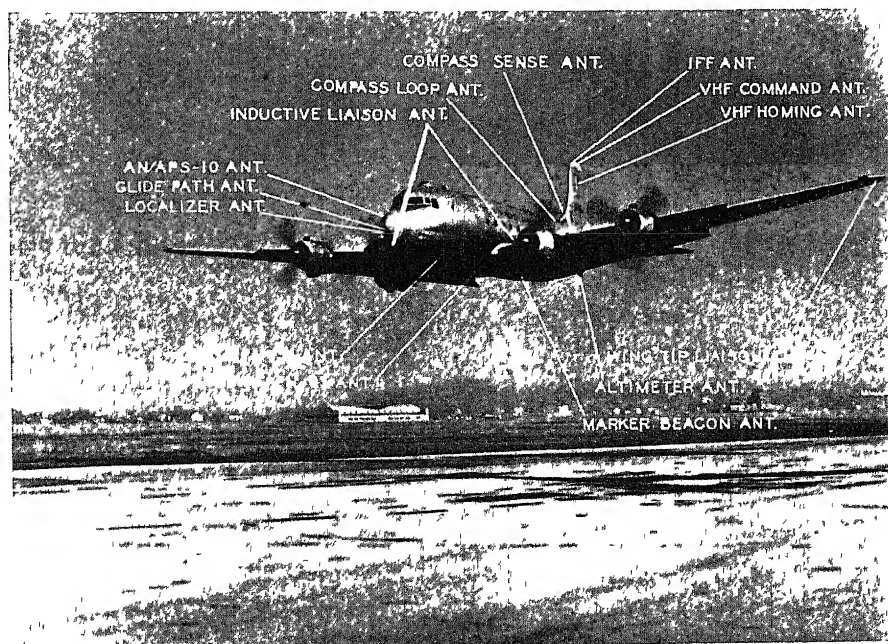
Flush-mounted antenna is a general term

that applies to the new types. One is a pick-axe shaped antenna which rides inside the aircraft tail, protected by a plastic radome. A slot type is a slit in a thin metal sheet set in the air plane surface and covered with a dielectric material.

Dr Whipple's theory of what makes up a comet, agrees with another new theory of how a comet starts. An English astronomer, R A Lyttleton of Cambridge University, recently proposed that the comet nucleus is formed by dust and gas pulled together by the sun's gravity.

The English astronomer suggested that this takes place 20 to 1,000 times the distance from the sun of the earth. Dr Whipple's theory favors the longer distance.

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15 BURIED ANTENNAS—Several hundred horsepower are saved by this new mounting of antennas under the aircraft skin. The former exterior mounting of antennas caused a drag on speedy planes.

Utilizing the same principle in an isolated tail cap, the fuselage can be energized to act as an antenna, Air Force scientists explain. The wing can also be energized by inserting an exciter coil close to it in the fuselage and electrically inducing energy over into the wing structure.

The importance of flush-mounting can perhaps best be seen in a C-54 cargo plane which has been outfitted with 15 dragless

antennas of all types. Two of these antennas are in the wings, three in the nose, four in the tail, two in the dorsal fin, and four in the fuselage. These include antennas for the marker beacon, Command very high frequency (VHF) set, identification equipment of the automatic IFF (Information, Friend or Foe) type, VHF homing device, loran (long-range navigation equipment), radio compass, and altimeter.

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ENGINEERING

Gas Turbine Locomotive

See Front Cover

► THE wraps have been removed from America's first gas turbine-electric locomotive which was demonstrated to a group of railroad men, engineers and scientists in Erie, Pa. Its primary power is its gas turbine engine, a powerplant already widely used in stationary installations and coming rapidly into use in speedy airplanes.

The gas turbine engine is somewhat similar to the better-known steam turbine, but it utilizes high pressure jets of gas delivered against vanes on a shaft to cause speedy revolution of the shaft. The type used on airplanes, together with the means of propulsion, is often called the turbo-prop to distinguish it from the turbo-jet used in direct jet propulsion. In the turbo-prop the gas engine drives conventional propellers geared to the shaft to which the vanes are fixed.

This new gas turbine-electric locomotive shown on this week's cover of the SCIENCE NEWS LETTER is a product of the American Locomotive Company and General Electric. The turbine drives the electrical equipment that provides the operating power. The electrical system is not new except for minor details. Similar systems are in use on diesel-powered locomotives. The gas turbine, developed for this particular application, differs in certain respects from other types.

Basically all gas turbines are much alike as far as general principles go. Air is drawn through a compressor into several combustion chambers where fuel is injected and the mixture is burned. Burning of the fuel

raises the temperature of the compressed air. The resulting gases are then expanded and move at great speed against the turbine buckets, or vanes, turning the shaft. Derived shaft power drives the load and the power plant compressor rotor.

The new Alco-G E unit delivers 4,500 horsepower. The locomotive has completed many road tests since November, 1948, and now will go into freight service on the Union Pacific for additional tests.

"Much remains to be done, even though it has completed certain road tests and performed very creditably," the group was told by Charles E. Wilson, president of General Electric. "But we certainly can assure you of one important thing: if the gas turbine-electric locomotive has possibilities as a major factor in railroad motive power, engineers of the General Electric Company and the American Locomotive Company will find that out!"

"The locomotive of the foreseeable future is the diesel-electric," the group was told by Robert B. McColl, president of Alco. "Today we are proud that we are furnishing the railroads in ever-increasing quantities with this efficient form of motive power." But he indicated faith in the new gas turbine type.

The present gas turbine locomotive burns low grade bunker oil for fuel. It exerts about twice as much horsepower at the rails as a diesel-electric locomotive of comparable size. Its power plant was described as at present much less efficient than the diesel engine. But with improvement in design and the use of better alloys its efficiency can be raised.

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The former German aerodynamics facilities, together with improvements developed at White Oak, were described by Dr. Raymond J. Seeger and Lyman C. Fisher of the Naval Ordnance Laboratory. They spoke as guests of Watson Davis, director of Science Service, on *Adventures in Science*, heard over the Columbia network.

Scientists at the White Oak Laboratory have recorded air speeds with the use of these tunnels more than five times faster than the speed of sound. Roughly it was equivalent to 3,960 miles an hour, Dr. Seeger stated. And, he added, that they envision even greater speeds will be possible when new ballistics ranges are completed. He expressed confidence that speeds up to 8,000 miles an hour are within reach, and stated that scientists at the laboratory predict figures as high as 12,000 miles an hour.

The new ballistics ranges were described by Mr. Fisher as unique. There are two of them. One is operated at atmospheric pressure, while in the other the pressure can be controlled to simulate a wide range of flight conditions. They will be used for basic research and also to check the information obtained in the wind tunnels, he said. In a wind tunnel, the model under test remains in one place and the air passes around it. In the ballistics range, the model is actually fired through the air.

A unique feature of these former German wind tunnels is the way air is forced through them. In most tunnels the air current comes from huge fans blowing the air into and through them. In the White Oak installation, the air current is the result of suction. A 52-foot steel sphere is employed. Vacuum pumps remove the air from the sphere. A valve is then opened, and air rushes through the tunnel into the sphere.

The air can be pumped out of the sphere in about ten minutes. It is refilled with air sucked through the tunnel in about 40 seconds. Forty seconds is, therefore, the testing time. To measure all the positions a missile will actually endure in flight means the running of many separate tests.

But what happens in this very short period can actually be noted through a specially designed optical system, which means that in a sense the wind can be seen, and high-speed photography makes pictures for later study. In studying the pictures, such things as temperature, humidity and the position of the missile undergoing test must all be considered.

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AERONAUTICS

German Wind Tunnels

► WIND TUNNELS of German origin at the White Oak Naval Ordnance Laboratory near Washington, already employed but just now going into official operation, are expected to play an important part in the development of American aviation and particularly in the perfection of guided missiles.

These tunnels were captured by the Amer-

ican Army in Bavaria late in the recent war, dismantled and shipped to this country and reerected at the White Oak site with the help of German technicians from the Bavarian group brought over for the purpose. They are the same tunnels in which the famous German V-2 rocket was developed.

Scanning radar, to detect approaching aircraft in the skies, can be given a far greater range than the ground-based equipment now has by mounting it in patrolling aircraft.

Strawberries have a higher vitamin C content than any of the other fruits commonly grown in northeastern states.

MEDICINE

Starvation Study Made

Twenty-two starving Jewish doctors made an objective study on the effects of hunger on the men, women and children confined in the Nazis' Warsaw Ghetto.

➤ A SCIENTIFIC study of hunger, made by physicians who, like all their patients, were starving to death, has just been published.

The authors of this book, "unique in scientific history," were 22 Jewish physicians confined to the Ghetto established by the Nazis in Warsaw in 1940. The last survivor of this group of doctors, Dr. Emil Apfelbaum, died in January, 1946, as a result of his experiences. Originally written by hand in Yiddish on official German Army stationery, the scientific manuscript has been translated into French and published in Warsaw by the American Joint Distribution Committee.

The story of the 500,000 men, women and children completely isolated in Warsaw Ghetto, with no soap, no fuel, no gas or electricity, often no water and no more than 800 calories a day of food, has been told. So has the story of their final armed resistance, their 42-day battle against the German Army, which ended when the last living Ghetto fighter wrapped himself in his flag and threw himself from the roof of the last standing building into the flames below.

Practically unknown to most Americans, including scientists, is the story of the co-operative medical research on starvation carried out by the 22 Jewish physicians.

"The complete scientific detachment of the authors of these studies from their own fate, and from the infernal background and surroundings of their studies, is almost incredible," declares Dr. Martin Gumpert, physician and author of New York, in his account in *THE AMERICAN SCHOLAR*.

In February, 1942, these physicians, recognizing the opportunity to add to scientific knowledge of the effect of starvation on the human body, began their practical work. Many essential scientific instruments were lacking. Those they had were bought outside the Ghetto and smuggled in at the risk of death. The doctors met monthly to discuss their observations. They "worked feverishly without a day's interruption, and in the months at their disposal accumulated a quantity of experiments and observations which would have taken many years to collect under normal conditions," Dr. Gumpert states.

The studies were made on children from six to 12 years and young adults from 20 to 40 years. These ages were chosen so that the biochemical changes of infancy, adolescence and advancing age would not affect the studies of the effects of starvation by itself.

"There is no mention of Hitler in the 262 pages of this work," Dr. Gumpert states. "The word 'Nazi' does not appear. There is no discussion of politics, no note of self-pity."

"The mental changes and attitudes of the children are among the earliest symptoms of hunger: their apathy, which increases with the progress of starvation," is the written observation of one of the 22 physicians, Dr. A. Braude-Heller.

"The organism which is destroyed by prolonged hunger is like a candle which burns out: life disappears gradually without a visible shock to the naked eye," reported Dr. Apfelbaum.

"The hunger sufferer grows lazy. He is a miser who aviciously guards what is left to him—that is, his last physical reserves. His motions are calculated, his slowness, sometimes even the complete lack of motion for several days, are very characteristic, his tendency to remain in a lying position, the somnolence, the silence, the sluggishness of the reflexes, the mental drowsiness—this is the customary picture of cachexia (marked ill health and malnutrition) due to hunger," Dr. Apfelbaum reported.

"Our study," he stated in his section of the report, "has aimed at an understanding of the mechanism which regulates this economizing of energy. The results should throw some light on the pathology (diseased state) of hunger. The material that was at our disposal cannot be compared with any thus far known, because of its magnitude and the advanced degree of starvation."

The orderly, scientific study of starvation continued until at last it was obvious that the manuscript must be removed from the Ghetto while there was still time. It was delivered to Dr. Witold Orlowski of the University of Warsaw.

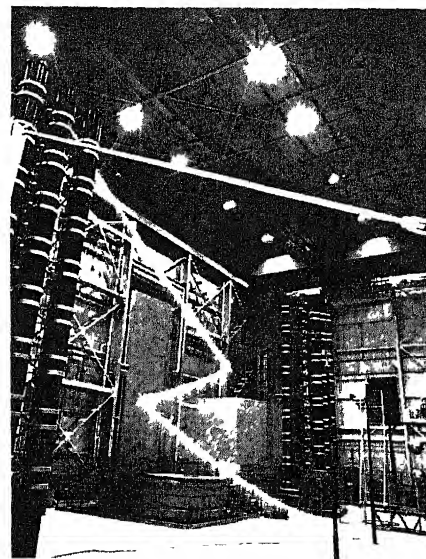
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ENGINEERING

Discharge Jumps 50 Feet In New High-Voltage Lab

➤ MAN-MADE "lightning" of 15,000,000 volts jumps 50 feet between two huge condensers in the new high-voltage laboratory of General Electric, in Pittsfield, Mass. It is said to be the greatest man-made high-voltage discharge in the world.

General Electric has carried out research in high voltages for many years, most of



MAN-MADE LIGHTNING — A streak of flame, then complete vaporization is the fate of a strand of copper wire charged with 5,000,000 volts of electric power in the new GE High Voltage Laboratory.

the work having been done so far in the old laboratory there or atop the Empire State Building in New York City. At the latter site, natural lightning was recorded during summer periods by means of photography and automatic recording instruments that provide data of value in determining voltage and other matters.

The new laboratory marks a forward step in the entire field of high-voltage research. The objective behind such research is to find the best means of eliminating the hazards of lightning in electric service, and to permit the transmission of steadily higher and higher voltages.

Second only to the 15,000,000-volt discharge at the laboratory is a three-phase arc. In demonstrating this arc, flames caused by tremendous high voltage climb high toward the ceiling. Planned is a series of demonstrations to show the effects of lightning on a scale model of a city street. In it man-made "lightning" will strike the buildings, first protected with lightning arresters and similar equipment, and then without such protection. Model airplanes will be used also to demonstrate the effect of lightning upon modern all-metal aircraft as distinguished from fabric covered planes.

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The *sherardizing method* of coating steel with zinc, employed with such objects as nuts, screws and bolts, consists of putting the articles and zinc dust in a revolving container with heat applied, the contact and heat do the coating.

DENTISTRY

Chlorophyll Tooth Paste May Be Decay Preventive

➤ A GREEN tooth paste containing chlorophyll, the green coloring matter of plants, was reported as a possible preventive of tooth decay.

Tests showing a drop in the number of *Lactobacillus acidophilus* organisms following the use of this paste were reported by Dr. Gustav W. Rapp of Loyola University, Chicago College of Dental Surgery, at the meeting of the International Association for Dental Research.

Dr. Rapp's report did not show whether the subjects of the experiment had more or less caries after using the tooth paste.

The chlorophyll tooth paste was used by 50 persons. Another tooth paste followed by a chlorophyll mouth wash was used by another 30 persons. They also had a drop in *Lactobacillus* count. A third group of 15 persons, used as a control, followed their normal tooth cleaning procedures, with less change in the bacterial count.

Dental authorities usually consider it necessary to have tests of tooth decay activity on several hundred persons, with controls on several hundred more, matched according to age, sex, race, diet, living conditions. X-ray studies and other factors, in order to evaluate any suggested anti-carious remedy or procedure.

The number of *Lactobacillus acidophilus* organisms in a person's saliva is sometimes taken as a sign of caries activity, and it is on this that Dr. Rapp's studies were based.

Science News Letter, July 2, 1949

NUCLEAR PHYSICS

Atomic Power Plants Need Instrument Development

➤ SPECIAL instruments that can be used in areas of intense radiation and high temperatures must be developed before atomic power plants can be widely used, the American Society of Mechanical Engineers was told in San Francisco by David Cochran and C. A. Hansen, Jr., General Electric engineers at the Knolls Atomic Power Laboratory.

As yet there are no demonstrated solutions to the unusual problems of applying instruments in an atomic power plant, they declared. The biggest obstacle to development of instruments for operating and maintaining an atomic power plant is lack of instrument testing facilities. These, however, will probably soon be available.

Only a few places exist in the country where the effect of radiation on materials and devices may be studied, or where liquid metal cooling systems are available for instrument testing. And nowhere, they stated, is there a combination of radiation and high temperature liquid metal

such as will exist in the atomic power plant.

Instruments are needed for control and safety of plant operation, for observing the condition and behavior of the plant, and for monitoring radiation leakage to assure protection of operating personnel. They must have extreme reliability, remote maintenance, resistance to neutron and gamma radiation, absolute leak tightness and long service.

Maintenance by remote control is necessary, they continued, since it is not possible to perform direct inspection and maintenance work on the detecting devices within the radioactive zone. When a failure occurs it may be necessary to remove and replace the instrument by means of remotely operated equipment, they said. Where the detecting elements are very difficult to remove, standby detecting elements must be installed at the time the plant is built.

Science News Letter, July 2, 1949

CHEMISTRY

Gelsoy from Soybean Is Good as Gel And as Glue

➤ THE Far-East soybean, already one of America's top-notch crops producing oil, meal, food, feeds and fodder, is now yielding a tight-sticking glue, dubbed Gelsoy, which is also a valuable food product, it was revealed at the Northern Regional Research Laboratory of the U. S. Department of Agriculture in Peoria, Ill.

It is said to be the first vegetable protein gel. As a glue, it could be used on envelopes which could not be "steamed" open. The heat of the steam will simply make the envelope flap stick tighter. Gelsoy glue will stick to tin, glass and other surfaces, so may play a big part in sticking labels on preserved foods in cans, jars and pottery containers. Many other uses are possible.

As a food, because of its bland taste and its whipping and gelling properties, many uses are possible. It is a nutritious substance, about half soybean protein and half carbohydrate, that has many of the qualities of egg white. It can be whipped into frothy meringues for pies, is useful in cookie and cake fillings, and may find its way into ice creams, candies, prepared cold meats, soups and other foods.

The value of Gelsoy as a gelling agent for food products and as an adhesive is a discovery credited to Mrs. Letta I. DeVoss, a scientific aide in the laboratory. Laboratory scientists had derived the new substance from the soybean, and Mrs. DeVoss started cooking a batch to test its whipping qualities. When it reached a temperature of about 190 degrees Fahrenheit it formed a jelly-like mass. For this discovery, she was given a Superior Service Award by Secretary Charles F. Brannan for the Department of Agriculture.

Science News Letter, July 2, 1949



BIOCHEMISTRY

Influenza Virus Made Radioactive

➤ A WAY to make influenza virus radioactive is announced by two Canadian scientists in the journal *NATURE* (June 18).

Their idea, apparently, was not to make the 'flu virus any deadlier, but, instead, to learn more about the mechanism of its synthesis, or growth, in the cells of the body.

They injected influenza virus into the fertile hen's eggs and then three hours later injected a solution containing radioactive phosphorus. In one of the experiments the radioactive solution injected into each egg registered 57,000 counts per minute on a Geiger-Muller counter.

After about 48 hours the virus which had been growing in the eggs was harvested and purified. Geiger-Muller counts and other tests showed that the virus had taken the radioactive phosphorus into its structure just as it would have taken up ordinary phosphorus.

The scientists reporting this are Drs. A. F. Graham and Laurella McClelland of the University of Toronto.

Science News Letter, July 2, 1949

ASTRONOMY

Giant Atomic Explosion Noted on Near Star

➤ ANOTHER violent atomic explosion has been observed on the earth's second nearest star neighbor.

The star, known as L-726-8, was announced by its discoverer, Dr. W. J. Luyten of the University of Minnesota, only last April. At that time it was reported that photographic plates had revealed a flare-up on the star on Dec. 8, when it suddenly became much brighter, only to die down to normal in a few minutes.

Another flare-up has now been found, this one on the last day of 1948. One photo plate showed that it was 10 times its normal brightness. Another plate, made six minutes later, showed the star to have dropped to six times normal brightness. Within 20 or 30 minutes, it was back to its normal brightness.

These star flare-ups are caused by tremendous atomic explosions, many times more violent than any man-made atomic bomb.

Even at the height of such a flare, the recently-discovered star is not visible to the naked eye.

Science News Letter, July 2, 1949

THE FIELDS

MEDICINE

Anti-Airsickness Drug May Make Pilots Sleepy

► COMMERCIAL airline pilots are being "advised" by the Civil Aeronautics Administration that the new anti-air sickness drug, dramamine, may make them sleepy.

If an occasional passenger gets drowsy it won't hurt, but for the pilot to have this reaction might be dangerous, the CAA points out. Tests were made on 22 CAA employees, who did not know whether the capsules they took each morning contained dramamine or milk sugar or a sleeping medicine. In two-thirds of the cases where dramamine was taken, mild side reactions were noted.

Not all persons who take this new medicine for motion sickness get drowsy. It is not a sedative, but an anti-histamine drug originally developed for treatment of allergies. Other anti-histamine drugs taken by hayfever, asthma and hives patients have caused sleepiness in an occasional, sensitive person. Slight dizziness, chills and detached sensations, loss of balance and difficulty of focusing eyes also occur occasionally, the CAA found.

Science News Letter, July 2, 1949

ENGINEERING

Selector Sorts Out Vast Amount of Information

► THE "rapid selector," newest of the famed postwar "electronic brain" machines, has been unveiled at the U. S. Department of Agriculture, with a promise of shorter hours in the library for researchers.

Information to be coded for the selector is put on 35-millimeter motion picture film; contents of some half-million conventional library cards can be put on a single reel. When you want all the information on a certain subject which is on some of the cards, you place a master key card in the machine. Photoelectric "eyes" of the machine pick the material you want and the machine photographs it for you.

The selector can scan the film at a rate of more than 60,000 subjects a minute. Some 10,000,000 different subjects can be coded in the selector potentially.

Information to be stored in the selector is microfilmed and coded by the use of black and white squares. It is the pattern of squares which catches the "eye" of the photoelectric cell. Photographing of the selected information is done by using high-speed photoflash techniques, including a repeating flashlamp.

Scientific literature and any other ma-

terial containing vast amounts of information which need to be stored compactly yet available for use are expected to be put into rapid selector machines. It is estimated that the new machine could scan in 15 minutes all the entries in Chemical Abstracts, a standard guide to chemical research, which have appeared in the past 30 years.

The first rapid selector is now being tested in the Department of Agriculture library under the direction of Department Librarian Ralph R. Shaw. Mr. Shaw supervised development of the machine which was done by Engineering Research Associates of Minneapolis, under an appropriation of more than \$75,000 from the Department of Commerce's Office of Technical Services. Principles from which the machine was developed are credited to Dr. Vannevar Bush, president of the Carnegie Institution of Washington.

Science News Letter, July 2, 1949

MEDICINE

New Muscle-Relaxing Drug Helps in Mental Patients

► MYANESIN, also called tolserol, a relatively new muscle-relaxing drug, now shows promise of helping in treatment of mental patients and alcoholics.

Preliminary trials of the drug in 63 patients are reported by Dr. Louis S. Schlan of Menard, Ill., State Hospital and Dr. Klaus R. Unna of the University of Illinois College of Medicine in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (June 25).

Its greatest benefits, apparently, will come in treatment of prolonged alcoholic intoxication and of anxiety states in mental patients.

The eight alcoholics, each with "shakes" after prolonged bouts, were able to lift a coffee cup in one hand without spilling within 30 to 60 minutes after taking the medicine. Before taking it they could not raise the cup to their lips without spilling even when using both hands.

Besides the physical "shakes," their severe jittery feelings or anxiety in psychiatric terms, were promptly relieved and the patients reported feeling comfortable though they still had such "hangover" effects as headache and stomach distress. They also said they got relief faster than with other sedatives and felt "wide awake" and closer to "normal."

The mental patients with anxiety were calmed without being put to sleep. They were able to sleep normally though previously their disturbed mental state had kept them awake.

The drug, the doctors state, is the only one they have seen "which allays anxiety without clouding consciousness. As such it promises to be helpful as an adjunct to psychotherapy."

Science News Letter, July 2, 1949

ASTRONOMY

Second Moon Discovered For Planet Neptune

► A NEW moon has been added to the 29 known moons in the solar system.

A second satellite to Neptune was confirmed by Dr. Gerard P. Kuiper, University of Chicago astronomer, who announced the possible discovery of the moon May 1 at McDonald Observatory, which is jointly operated by the University of Texas and the University of Chicago.

Discovery of the satellite, which is 250,000 times fainter than the faintest star visible with the naked eye, was announced by Dr. Kuiper at the summer meeting of the American Astronomical Society in Ottawa.

Five million miles from Neptune and 3,000,000,000 miles from earth, the second satellite was established as a second moon to the planet Neptune from studies of photographic plates taken May 29 on the 82-inch reflecting telescope at McDonald Observatory.

The satellite, Dr. Kuiper announced, is only 200 miles in diameter, 15 times smaller and 250 times fainter than the first satellite to Neptune, Triton, which was discovered in 1846. Its magnitude of 19½ degrees makes it the faintest moon observed to date, so faint that it probably cannot even be seen through the 200-inch reflecting telescope.

Dr. Kuiper, who discovered a fifth moon to the planet Uranus in March, 1948, estimated that the new moon, moving in nearly the same plane as Neptune, requires two years to complete its cycle. Earth's moon completes its orbit in one month.

Science News Letter, July 2, 1949

PSYCHOLOGY

Psychologists' Must Reading: Comic Strips

► WITH comic strip characters invading psychological tests, daily reading of the comics has become a line of duty activity for members of the staff of the Menninger Foundation in Topeka, Kans.

The comic strip characters got into the Rorschach tests, a report from the Foundation explains. In these tests patients are given cards with standardized blobs of color or black spots on white, like ink blots. From the patient's interpretation of what these blobs look like to him the psychologists get important clues to the patient's personality and illness.

Witches on broomsticks, dancing fairies, and various animals used to be among the responses given. Now the patients say the blobs look like various comic strip characters.

"The result," says the report, "is that psychologists have a perfect excuse for reading the daily comic strips."

Science News Letter, July 2, 1949

MEDICINE

Unique Animals Aid Science

Mice that have fits are helping scientists study diseases of the nervous system, while dogs who broadcast their feelings help environmental and heredity studies.

By JANE STAFFORD

➤ A CAT with four ears, a "fierce" bunny rabbit, mice that have fits when the doorbell rings, dogs that broadcast how they feel when burying a bone or chasing a stick seem like imaginary characters in a nursery tale.

Actually these strange characters are real animals. They and their ancestors and offspring and other relatives are playing an important part in man's fight against disease.

The mice that crack up when a bell rings belong to a mouse family that develops breast cancer in a high proportion of its female members. They are of a special strain, bred to develop cancer, so that scientists could study this disease in the search for better ways of fighting it.

The cancer fighters who bred these mice, however, are not just fighting cancer. They are trained to observe every little detail about their laboratory animals, and they are constantly probing into the fundamentals of cancer, particularly the genetic, or hereditary, background which influences growth of all kinds, normal as well as cancerous. So when the mice broke down and went into convulsions at the sound of a loud bell, the scientists recognized that these mice had developed a strange kind of nervous system. The mice, as they at once suspected, turned out to be valuable research animals for scientists studying diseases of the nervous system, such as epilepsy, in humans.

Jackson Laboratory

The oversensitive mice were bred at a unique mouse farm, known in scientific circles the world over, the Roscoe B. Jackson Memorial Laboratory. The Jackson Laboratory is located at Bar Harbor, Me. Neither the Laboratory nor its mice escaped the holocaust that destroyed millionaires' homes and all in its wake during the forest fire at Bar Harbor in the fall of 1947.

The original Laboratory building, the entire group of summer research buildings, two caretakers' residences, one story and a third wing of another building, 90,000 research mice, the whole laboratory, most of the equipment, all correspondence, most of the old records, all the collection of microscopic slide records, and all the current experiments of the main laboratory staff went up in smoke and flames. Other parts of the laboratory buildings were gutted, weakened and badly damaged.

Research on cancer and many other diseases was slowed in laboratories all over the world, in some cases completely stopped, because these laboratories depended on Jackson Laboratory for the mice that were helping them unravel the mysteries of disease.

The laboratory has come back, and so have the mice. Almost as soon as the flames had died away, rebuilding was begun. And, shortly after, the mice began arriving, a few from this place, a few more from another. The returning mice were descendants of those Jackson Laboratory had bred and supplied to other research laboratories. From these returned offspring, a colony of some 70,000 mice has been built up.

Between 2,000 and 4,000 mice are now being shipped from Jackson Laboratory each week to other laboratories for research use. But before the fire twice that number were shipped each week. And the demand for these inbred, standardized mice has not slackened. Right after the fire a letter arrived from a laboratory in Siam asking for mice for the first cancer research project to be started in that country. More than 150 major research laboratories in the United States besides many abroad, even in Moscow, depend on Jackson Laboratory for their mice for research not only on cancer but on infantile paralysis, influenza and other diseases.

It costs money to raise mice. Bed and board per mouse comes to about \$5 per year, which sounds trifling, but when multiplied by the laboratory's present mouse population of 70,000 it is a sizable sum. This is one reason why Jackson Laboratory, although it has received generous gifts for rebuilding since the fire, continues to need money to support its work.

Breeding and supplying special, standardized strains of mice may be the most widely known activity of the laboratory, but it is in a way only a minor activity. Cancer research, after all, is the main objective of the laboratory and has been since its founding as a memorial to the late Roscoe B. Jackson. Research in cancer can be done in two ways, the director of Jackson Laboratory, Dr. C. C. Little, explains. One is through an efficient attack on problems that can be defined and organized for study. This is the method that built the atom bomb from the theory of atomic energy. It is important as a method of cancer research and is being pushed in many laboratories.

The second method of cancer research is to use man's creative power and imagina-

tion to "bring from the unknown new knowledge for the benefit of mankind." This second method is the one followed at Jackson Laboratory. It is one which all connected with the laboratory hope will lead to the conquest of cancer, but which may instead lead to quite unforeseeable but equally important results.

That is the story back of the four-eared cat. She was contributed to Jackson Laboratory by Mrs. George Wood, of Ashtabula, Ohio. Mrs. Wood recognized that the cat was an oddity, but she was not content, as many a person might have been, to let it go at that. She suspected such an odd cat might have value to scientists of the kind working at Jackson Laboratory.

Four-Eared Mutation

The geneticists at the laboratory knew that the four-eared condition was a mutation, and they were curious as to what kind of a mutation it was. Would all of Mistress Four-Ears' descendants have four ears, too? So they bred the cat, and after two and a half years, Dr. Little and Research Assistant Edna DuBois have succeeded in getting Mrs. Four-Ears to bear four-eared offspring. The extra ears on mother and kittens, they say, are actually an overdevelopment of the lower ear lobes. The trait appears to be inherited recessively.

The theory that cancer, or a tendency to it, is an inherited trait has been the subject of extensive research at Jackson Laboratory.



UNCOMMON MOUSE—When the bell rings this mouse has fits. Scientists hope to learn more about human epilepsy by studying this phenomenon in such animals.



MRS. FOUR-EARS—This family of four-eared cats may lead to new discoveries about heredity.

and elsewhere. It was here that the maternal influence on the development of breast cancer was first detected in mother's milk (mouse—not human). This "influence" is now known as the milk factor which causes cancer in mice nursed by the female carrying it, but not in her offspring if they are foster-fed.

In studies of hereditary factors, in cancer or other conditions, factors of environment must also be considered and ruled out, if possible. So some of the work at Jackson Laboratory has turned to studies of environment as well as studies of genetics, or heredity as the layman terms it.

This is where the broadcasting pups come into the picture. How much of a dog's characteristics are due to his breed and how much to his environment? Is a wire-haired terrier lively and nervous because he is

a wire-haired or because he has learned that behavior from his mother as a puppy? How does a dog feel when he sees another dog, or his master? Does his heart beat faster? Taking a dog's pulse and blood pressure in the laboratory give one kind of information, but the Jackson Laboratory scientists wanted to know about a dog's reactions under more natural conditions. So Dr. John L. Fuller and co-workers developed an instrument, the radio-inductograph, to get such information. It is a compact shortwave radio set through which a dog can broadcast his emotional and physiological experiences while free and leading a normal existence. What the animals will tell on these records may be important for dogs, dog-owners and other animals and humans generally.

Science News Letter, July 2, 1949

CHEMISTRY

Plastic for Photo Film

➤ OLD-FASHIONED gelatin, made from skin of calves, may in the future give way to a synthetic plastic as the emulsion material that coats photographic film and carries the chemicals that are affected by light and make the picture.

The replacement of conventional gelatin by a synthetic polymer resin in a Du Pont color printing film suggests that synthetic material may eventually be used in more photographic films.

Color film emulsions using gelatin have

a chemical put into them which makes the dyes stick to the silver image, called a color former. The new film uses the synthetic polymer to replace both the color former and the gelatin binder, thus making the one substance do the work of two.

Because the new color former plastic is only swollen by water, the dyes in the resulting picture are deposited in place and keep the picture sharper than by the older method.

The new color film announced by Du

Pont is for professional 35 mm motion picture projection. The film consists of three emulsion layers superimposed on one side of standard cine film base. Each layer contains the sensitive silver salts suspended in the new color former plastic.

In each emulsion the amount of dye in the final print is proportional to the amount of silver deposited by the first exposure and development.

The gelatin now in use for photographic films is made from the skin of calves. The quality and impurities of gelatin have a great effect on the sensitivity of the photographic emulsion. The plants that the animals eat affect the gelatin made from their skin. Two drops of mustard oil per ton of emulsion is enough to increase the sensitivity of a gelatin emulsion.

The synthetic resin can be made under controlled conditions and should be more uniform. The physical characteristics of some of the synthetic plastics may be better than that of gelatin. It may have better dimensional stability.

Science News Letter, July 2, 1949

Words in Science— TRANSONIC-ULTRASONIC

➤ TRANSONIC is a word used to describe the speed of very fast airplanes and projectiles which travel at or about the speed of sound. The speed of sound at sea level is about 760 miles per hour. Speeds from about 90% of sound's speed to 120% of it come within the range known as transonic. Speeds higher than that are called supersonic.

Ultrasonic is not used in connection with aviation speeds. It is the word applied by scientists to sound waves of very high frequencies, with pitch beyond the limit of human hearing. Ultrasonic waves have various uses such as the testing of metals for flaws, killing of bacteria, and elimination of smoke.

Science News Letter, July 2, 1949

HOUSES OF EARTH

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VETERINARY MEDICINE

Hard Pad Disease in Dogs

England's dogs are being attacked by a fatal disease which turns the pads of their feet to iron-like hardness. A virus is the responsible agent.

➤ A DISEASE that turns the pads on a dog's feet as hard as iron is rapidly displacing distemper as the number one killer of dogs in England

It is called, logically enough, "hard pad disease" Like distemper, it is caused by a filterable virus In some ways it seems to be a freak offshoot of distemper virus

Most distinguishing characteristic of this new disease is that in most cases the pads on the dog's feet, and sometimes the end of the nose as well, become thick and hard

When a dog with hard pad disease walks on a wooden floor its feet beat out a drum-like tattoo Veterinarians in England now tap the pads of all distemper suspects with a pencil A sharp clicking means hard pad disease

In fact, in about half of the cases fits are the first symptoms of hard pad disease Sometimes they are so violent that the dog dies before the pads have a chance to harden

Other complications of the disease are severe diarrhea and edema of the lungs, the latter frequently being cause of death

When a dog recovers from a typical case of hard pad disease the hardened pads and nose come away as perfect casts, leaving soft normal tissue beneath Unfortunately, most dogs do not recover from hard pad disease.

There is, however, one bright spot in the picture A team of researchers of Burroughs, Wellcome and Company laboratories have developed a very effective vaccine against the disease The scientists are A. B. Macintyre, Dr. D J Trevan and Dr R F Montgomerie

Their vaccine is a 20% emulsion of infected dog spleen, with one-quarter of one percent formalin One dose injected under the skin gives very effective protection

They have also developed a strong serum for protecting dogs which have been exposed to the disease and for treating dogs already sick

Immunization with hard pad virus does not protect against distemper, though immunity against distemper, especially if naturally acquired, may bestow some immunity against hard pad disease But at best this cross-protection is unreliable

First inkling of the presence of the disease in English dog population came in 1945, when complaints began coming in that supposedly reliable distemper serums and vaccines were failing to protect dogs against "distemper" Puzzled research workers could only surmise that this latter "distemper" was not the true distemper of dogs, for which the immunizing agents were designed and against which they were effective

The British scientists set out to unravel the riddle They soon discovered that the case histories of many of the sick dogs they examined were not typical of distemper

In 1945, Dr Margaret Schettlin, a Swiss researcher visiting the English laboratories, pointed out to the team of scientists that in Switzerland when she found hard pads on a dog she could lay an odds-on bet that within a few days the dog would develop fits and convulsions This fitted in with what the English workers found on checking over their own cases

The virus seems actually to attack all the body tissues and the disease has been passed from sick dogs to ferrets by injection of foot pad, brain, spleen and lung tissue. In pregnant bitches it attacks the embryo and causes abortion The virus has been recovered from the premature aborted embryos On the other hand, the infection has been observed in a 13-year-old dog

So far as is definitely known, cats do not get hard pad disease One cat that had convulsions is regarded as a possible suspect, but it did not develop the typical hard pads such as is usually seen in infected dogs

One curious fact that Dr Montgomerie and his co-workers have uncovered is that some sulfa drugs, far from being a cure for the disease, actually help bring on the disease in laboratory-injected dogs While the typical disease can readily be produced in ferrets by injection of hard pad virus, such injection in dogs ordinarily brings only a fever lasting about ten days to two weeks, after which the dogs get well But when the English scientists gave their dogs certain of the sulfa drugs along with the

virus, five out of six dogs developed all the nervous symptoms, while three developed hard pads as well

Science News Letter, July 2, 1949

VETERINARY MEDICINE

American Scientists Are Investigating Hard Pad

➤ HARD PAD disease of dogs is being investigated in this country, Dr J G Hardenbergh, executive secretary of the American Veterinary Medical Association told Science Service

Numbers of cases of the disease and the numbers of deaths it has caused among dogs in the United States are not known, Dr Hardenbergh said, but the hard pad condition has been reported to occur in about five percent of dogs with symptoms of distemper

Hard pad disease characteristics are not considered new to American veterinarians and more research is needed on this condition to distinguish it from other manifestations of distemper, Dr Hardenbergh explained

Science News Letter, July 2, 1949

MEDICINE

Radiation Fails Against Disease-Causing Worm

➤ SMALL-SCALE atomic warfare has thus far failed against the little worms that cause a relatively common American disease

The worms, *Trichinella spiralis*, cause trichinosis, a disease humans get from eating raw pork containing one form of the worms. Dr Joseph E Alicata and George O Burr of the University of Hawaii and the Hawaiian Sugar Planters' Association Experiment Station tried potent gamma radiation, one of the hazards of atomic bomb blasts, against meat containing the worms

Results, reported in the journal, *SCIENCE* (June 10), show more or less a victory for the worms The rays rendered female worms sterile On the other hand, larvae encysted in meat, the form of the parasite which gives humans the disease, were not killed by the radiations used

Next step, say the scientists, will be experiments with a larger dose of gamma rays Aim of the work is a radiation treatment for meat which will protect against trichinosis.

Science News Letter, July 2, 1949

SCIENCE FILMSTRIPS

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Dr Benjamin Minge Duggar, of the Lederle Laboratories, American Cyanamid Company, Pearl River, N. Y. discoverer of aureomycin, will talk about "Golden Disease Fighter—Aureomycin"

MEDICINE

Methadon Habit-Forming

➤ WARNING that the new pain-relieving drug, methadon, may cause addiction was given physicians by Drs Harris Isbell and Victor H Vogel, of the U S Public Health Service Hospital, Lexington, Ky

The doctors pointed out the falsity of the idea that methadon does not produce the pleasant feelings that come from morphine as taken by the addict and that a person does not become physically dependent upon the drug

Studies carried out at the hospital under the auspices of the Drug Addiction Committee of the National Research Council show that methadon is a dangerous addicting drug, the physicians report in the AMERICAN JOURNAL OF PSYCHIATRY (June)

In fact, addicts prefer this drug to morphine, heroin or dilaudid

To test the drug's effects, 15 former morphine addicts who volunteered were given four daily doses of methadon The dosage was increased as tolerance developed from an initial five to 10 milligrams per dose to as high as 100 milligrams per dose in the three cases who stayed on the drug longest

When they got only five milligrams per shot, none of the addictive drug effects

were noticeable, and the men complained about the drug But when the dosage was increased to 10 to 15 milligrams per shot, the men began to express satisfaction with the effects although these did not become noticeable until after the third or fourth dose Then the men's behavior became strikingly similar to that during addiction to morphine

They stopped nearly all productive activity and spent most of their time in bed in a dreamy half-asleep state which they call being "on the nod," or "coasting" They neglected their persons and their quarters

Shots of 20-30 milligrams of methadon produced particularly striking effects, the report states

"The addicts would writhe in joy, and comment as follows 'O boy! That's a fine shot of dope Can we get it outside? Who makes it? Will it be put under the Harrison Law?'"

The methadon can be taken away from the patients without the severe withdrawal symptoms that follow when addicts are taken off morphine It is used routinely in the hospital to wean morphine addicts from that drug First, patients are switched to methadon, and then later the methadon

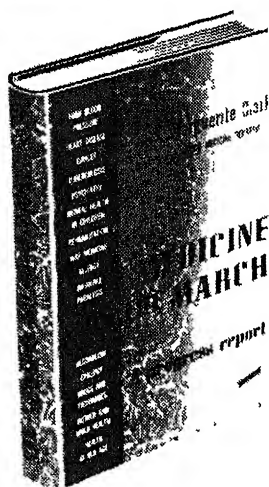
is taken away It is the most satisfactory method of withdrawal yet found, the report states But, it is pointed out, although the physical dependence on the drug is not so evident as with morphine, the emotional or mental leaning on the drug remains to be dealt with Loss of emotional control occurs just as frequently following substitution and withdrawal of methadon as it does after withdrawal of morphine

There is not much danger of addiction to methadon in the ordinary legitimate medical use of the drug, the report states Signs of physical dependence on the drug were noticed in only two of 19 cases where it had been used for relief of pain in cancer for from 35 days to 180 days and even in these two cases, the symptoms were very mild As long as the dosage of either morphine or methadon is held to the minimum required for pain relief, there is very little likelihood of addiction to either drug, the report concludes The danger of "medical" addiction is "great only when physicians mistakenly believe that a drug is not addicting and are careless in its use"

Methadon is also known under the names of amidone, dolophine, and 10820

Reinforcement of the warning by Drs Isbell and Vogel is contained in an editorial in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (June 11) which declares that the danger of addiction to methadon is almost as great as that for morphine

Science News Letter, July 2, 1949



Here are the up-to-date facts on medicine's latest discoveries...

DURING the 5 year war period, American medicine advanced 25 years Here is down-to-earth, accurate reporting of this advance in 15 important fields The 15 chapters in this book cover the work of hundreds of top medical specialists and researchers in America and include the latest treatments, surgical techniques and drugs that have been tried out with success Included for the first time is a comprehensive study of the use of radio-active elements in the diagnosis and treatment of disease

The author, head of *Newsweek's* Medical Department, is Secretary-Treasurer of the National Association of Science Writers, and one of the few women members. She is widely known for her ability to write accurate, trustworthy medical articles in non-technical language the layman can understand.

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- Allergy
- Infantile Paralysis
- Alcoholism
- Epilepsy
- Drugs & Techniques
- Mother & Child Health
- Health in Old Age





Before the Eagle

➤ **ALTHOUGH** this country has no national tree, as England has the oak and Canada the maple, a tree was used as symbol of American honor and independence long before the eagle was officially adopted as the device to be used on the Great Seal of the United States and subsequently on our coinage and currency.

Until the Continental Congress adopted a national flag and specified its basic design, each state flew a flag of its own. The flag of Massachusetts, which floated over the stoutly defended breastworks at Bunker Hill, consisted of a white field displaying a green pine tree, with the motto "An Appeal to Heaven." This motto was suggested, no doubt, by the upward-pointing spire of the tree, so like the monitory steeples that reared themselves above all New England villages.

Even before it appeared on their flag, the pine tree was used as a symbol on the coinage of Massachusetts Bay Colony. The Pine Tree Shilling, struck in the seventeenth century, is one of the greatest of numismatic treasures.

Which particular pine tree was thus chosen for honor by the men of Massachusetts is not specifically stated, but there can be little doubt that it was the white pine. It was abundant in early days, it had great majesty and beauty, and was useful and

valuable as well as beautiful. Towering trunks cut from virgin forests made magnificent masts—important in a seafaring and shipbuilding community. Smaller specimens were hewn into logs for the early cabins, sawed into splendid, smooth lumber for the fine frame houses and churches that have made New England's early builders deservedly famous.

But alas! we could no longer adopt the white pine as our national tree even if we wanted to. For just as we have practically exterminated the American eagle from all save a few still-wild spots under American sovereignty, so have we wiped out most of our white pine forests. We have either prodigally chopped them down without taking the trouble to replant them, or more wastefully still, have permitted fire to ravage them unchecked. And the spread of a terrible tree disease, white pine blister rust, has made re-establishment of white-pine woodlands even more difficult.

Science News Letter, July 2, 1949

MEDICINE

Some Diaper-Marking Dyes Reported Poisoning Babies

➤ **WARNING** of a new danger to babies, especially premature ones, is issued by the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (June 25).

Aniline, or coal tar, dyes used to mark diapers can poison the babies, the chemical being absorbed through the skin. Such poisoning of 72 babies, five of them fatally, has been reported.

The danger can be simply prevented, the JOURNAL states, by boiling the diapers after they are stamped and drying them thoroughly before use. This fixes the dye so that it cannot be absorbed. Non-poisonous vegetable dyes, charcoal and silver nitrate are impractical for marking diapers because the marks from these fade with the repeated laundering in large institutions.

Science News Letter, July 2, 1949

ZOOLOGY

Mice Migrate Within Their Barn "World"

➤ **THE** "home country" of a common house mouse is not very large—a range of 60 feet for males and only 40 for the more timid females, Robert Z. Brown of the Johns Hopkins University discovered in the course of a study of mouse migrations within a large barn that constituted their world. He reported his observations before the meeting of the American Society of Mammalogists in Washington.

He live-trapped members of the barn's mouse population, estimated at 150 to 200, marked them for identification, and re-trapped them later to find out where and how far they had gone. There was a sea-

sonal migration as the weather grew colder in the winter, mice in the outer rooms of the barn leaving their home ranges and seeking more comfortable homes in an inner room filled with hay.

There was also a seasonal drop in the mouse population from a high in December to a low in February, and back again to high in April. Sharpest midwinter decreases took place among the juvenile and young-adult mice.

Science News Letter, July 2, 1949

MAINTENANT

Les Livres Français

Now you can obtain through Science Service the latest and best scientific books published in France. Just order the books listed here for your convenience, remitting to the Retail Book Department of Science Service. The books will be sent you by fast steamer, postpaid.

LES DIASTASES—Paul Fleury and Jean Courtois—216 p. illus., \$1.50. The authors are on the Faculté de Pharmacie de Paris. The organic catalysts are complex substances that play an essential role in the constant transformations of the cell. The original views expressed relate to their relationship to proteins and the role played in the cell.

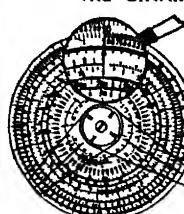
TECHNIQUES GENERALES DU LABORATOIRE DE PHYSIQUE—J. Surugue, preface by F. Joliot-Curie—434 p. illus., \$5.00. Are you interested in glass blowing, high temperature furnaces, spectrum measurements? Do you want to learn scientific French painlessly? If so, you will want the outstanding new book on laboratory techniques—how to do and make things—recently issued by the French National Center of Scientific Research. A profusion of drawings and illustrations with labelled parts virtually serves as a dictionary for the learning student. The collection of useful facts, gadgets, ideas and useful tabulations makes exciting reading, while each section has careful explanations of the physical principles involved. No book written in English serves the function of this book in French.

LES MOLECULES GEANTES ET LEURS APPLICATIONS—G. Champetier—\$4.00. An authoritative work written in non-technical style covering fundamental chemistry and physics applying to the large molecules followed by an inventory of compounds utilizing them: plastics, synthetic rubber, oils, varnishes and many others of industrial importance.

CHIMIE PHOTOGRAPHIQUE—L. Glafkides, preface by L.-P. Clerc—607 p., illus., \$8.00. Based on the author's own experience acquired in France and in the United States where he worked for several years, and also on 1,500 references. Covers the image, emulsions, sensitizing, reproduction in colors and a non-technical chapter on the fundamentals of chemistry. If you are an amateur photographer who wants to understand the science which makes possible your artistic results, you will be interested in this work.

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Books of the Week

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THE ARMY AIR FORCES IN WORLD WAR II, VOL. II Europe—Torch to Pointblank (August 1942 to December 1943)—W F Craven and J L Cate, Eds.—*University of Chicago Press*, 896 p, illus, \$6.00. This volume, the second of seven compiled for the Army Air Forces, deals with the early phases of the air warfare in North Africa, Sicily, Italy, other occupied countries, and Germany.

BIOMETRICAL GENETICS The Study of Continuous Variation—K Mather—*Dover*, 158 p, illus, \$3.50. Based on the use of measurements, this book presents the kind of evidence upon which the genetic theory of continuous variation rests. For those who already have some knowledge of genetics and statistics.

BIRDS OF CONCORD—Ludlow Griscom—*Harvard University Press*, 340 p, illus, \$5.00. Based on a half century of bird notes by members of the Nuttall Ornithological Club and showing the effects of civilization on bird populations. For the nature lover and the ornithologist.

BITUMINOUS COAL Facts and Figures—*Bituminous Coal Institute*, 148 p, illus, paper, 60 cents. Covers mining, distribution and consumption.

BOYS WANT TO KNOW—Jacob A. Goldberg—*New York Tuberculosis and Health Association*, 12 p, paper, free upon request to publisher, Social Hygiene Committee, 386 Fourth Avenue, New York 17, N Y. (A stamped addressed envelope must be enclosed.) This booklet answers a few of the questions which teen-age boys might ask about social adjustment, sex, and physical and mental health.

THE COMPLETE BOOK OF POTTERY MAKING—John B. Kenny—*Greenberg*, 242 p, illus, \$7.50. Includes the fundamentals of the art as well as the highly technical skills.

ECONOMIC AND SOCIAL PROBLEMS IN THE UNITED NATIONS World Food Problems—Department of State, 7 p, paper, free upon request to Office of Public Affairs, U S Dept of State, Washington 25, D C. Correction (See SNL, June 4).

ELECTRIC RESISTANCE STRAIN GAUGES—W B Dobie and P C G Isaac—*English Universities Press* (Distributed in this country by Macmillan), 114 p, illus, \$3.50. A description for engineers, of gauge techniques and applications from weighing aircraft to estimating stresses in the brain of a dog. Of British origin.

GENERAL CHEMISTRY—A W. Laubengayer—*Reinhart*, 528 p, illus, \$4.25. A first-year college text for those who desire to go on in chemistry or related fields.

GEOMETRY, VOL. II: Elementary Mathematics from an Advanced Standpoint—Felix Klein—*Dover*, 214 p, illus, \$2.95. For advanced students and teachers.

HOME STUDY BLUE BOOK—J S. Noffsinger—*National Home Study Council*, 32 p, illus, paper, free upon request to publisher, 839 17th Street, N. W., Washington, D C. Includes

a directory of approved home study schools and courses.

HYDROLOGY—Oskar E. Meinzer, Ed.—*Dover*, 712 p, illus, \$4.95. One of a series of books prepared by the National Research Council to give the non-specialist reader a summary of knowledge in the earth sciences. This has to do with rain, snow, drought and food and the water on the earth in general.

THE INCANDESCENT LIGHT—A Review of Its Invention and Application—*Thomas Alva Edison Foundation*, 76 p, illus, paper, 70 cents. The first in a series which will cover the most important inventions of Edison based on about 2500 notebooks left by him. Foreword by Charles F. Kettering.

INDIVIDUAL BEHAVIOR A New Frame of Reference for Psychology—Donald Snygg and Arthur W. Combs—*Harper*, 386 p, \$3.50. Correction (See SNL June 11).

INTRODUCTION TO THE THEORY OF FOURIER'S SERIES AND INTEGRALS—H S. Carslaw—*Dover*, 3rd rev ed, 368 p, illus, \$3.95. A large number of corrections included since the last printing.

JAMES WATT AND THE HISTORY OF STEAM POWER—Ivor A. Hart—*Schuman*, 250 p, illus, \$4.00. A biography of the great 18th-century Scotch engineer and an account of his contribution to the history of human progress.

MAGNETIC RECORDING—S J. Begun—*Murray Hill*, 242 p, illus, \$5.00. Brings together full and accurate information on this electronic development.

MATHEMATICAL FOUNDATIONS OF STATISTICAL MECHANICS—A I. Khinchin, translated from the Russian by G. Gamow—*Dover*, 179 p, illus, \$2.95. New material included in this book is the systematic use of limit theorems of the theory of probability for rigorous proofs of asymptotic formulas without any special analytic apparatus. Primarily for the mathematician.

MEDICINE ON THE MARCH A Progress Report—Marguerite Clark—*Funk & Wagnalls*, 308 p, \$3.50. A review of the advances of the five-year war period as they have been reported in authoritative medical literature, government reports, papers read at medical meetings.

MICRO-WAVES AND WAVE GUIDES—H M. Barlow—*Dover*, 122 p, illus, \$1.95. A complete survey of this field written for the engineer and physicist by a leading authority.

MODERN PLASTICS ENCYCLOPEDIA—Gordon M. Kline, Editorial Director—*Plastics Catalogue Corporation*, 1371 p, illus, \$5.00. A standard reference work designed as a working guide to all phases of plastics planning and production.

MOLECULAR INTERACTION—Roy Waldo Miner and Paul Lenihan, Eds.—*The New York Academy of Sciences*, 851 p, illus, \$4.00. The results of a Conference held by the Section of Physics and Chemistry on April 9 and 10, 1948.

MOST OFTEN NEEDED 1949 TELEVISION SERVING INFORMATION—M N. Beitman—*Supreme Publications*, 192 p, illus, paper, \$3.00. Factory data on popular and interesting sets of the more important manufacturers. Many diagrams.

PRE-MEDICAL PHYSICAL CHEMISTRY—F A. Matsen, Jack Myers, and Norman Hackerman—*Macmillan*, 344 p, illus, \$4.75. Presupposes knowledge of general chemistry, analytical chemistry, physics and mathematics.

THE SKIN PROBLEM FACING YOUNG MEN AND WOMEN—Herbert Lawrence—*Timely Publications*, 70 p, paper, \$1.50. An explanation for the layman of this common teen-age problem.

TELEPHONE AND TELEGRAPH A Public Primer about Wire, Cable, and Radio Common Carriers Their Development, Operation, and Regulation—Federal Communications Commission—*Gov't Printing Office*, 29 p, paper, 10 cents.

Science News Letter, July 2, 1949

WILDLIFE

Chipmunks Have Definite Ranges for Food-Gathering

➤ WESTERN chipmunks have definitely established ranges where they exercise exclusive food-gathering rights, Harold E. Broadbooks of the University of Michigan told members of the American Society of Mammalogists in Washington. For females, the home range has an average extent of 236 acres, for males, 38 acres. The range area tends to be larger in summer than in spring or fall.

Mr. Broadbooks learned where these little animals consider themselves "at home" by live-trapping them on a 42-acre tract in a yellow pine forest, and marking them with dye so that he would know them when he saw them again. He noticed that all ranges overlapped, but that the extent of the overlap of any one individual was always small.

Chipmunks captured and carried as much as a mile from their ranges found their way home again.

Science News Letter, July 2, 1949

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⚙️ **DOOR HANDLE**, to replace the knob that has to be turned, is an attractive plastic affair with a push-button at its center. Thumb pressure on this button releases the latch bolt so that the door can be opened. Closing the door relocks the latch.

Science News Letter, July 2, 1949

⚙️ **STEAM IRONING** attachment for an electric flatiron can be removed when the flatiron is used in ordinary work. The steam ironing surface has a space between it and the regular iron into which water from a reservoir drips slowly to be converted instantly into steam by the heat of the flatiron.

Science News Letter, July 2, 1949

⚙️ **MOLECULAR WEIGHT** meter utilizes the freezing-point method in determining the molecular weight of liquids and solids. In operation, the apparatus is plugged into a 115-volt line, and we put in its Dewar flask. The freezing point of a liquid of known molecular weight is determined and compared with the freezing point when the material of unknown molecular weight is added to it.

Science News Letter, July 2, 1949

⚙️ **SEALED BEAM** headlight for bicycles, shown in the picture, is similar to the type used on automobiles and produces a beam



pattern approximately five feet wide and 30 feet long, or three times the light given by the ordinary bicycle lamp. It operates on a battery of the five-volt hand-lantern type.

Science News Letter, July 2, 1949

⚙️ **STEAM CLEANER**, improved portable high-pressure type designed particularly for automobile service stations and small industrial plants, is featured by instant starting, instant steaming, and automatic nozzle control mechanism which permits

operator to stop and start the machine at the cleaning job.

Science News Letter, July 2, 1949

⚙️ **PLASTIC HANDLE**, for the candy-on-a-stick combination that youngsters enjoy, provides safety from stick-injury because it is made of a material that flexes, or bends, on the slightest impact. This odorless, tasteless, sanitary safety handle is flat and without a point or sharp edge.

Science News Letter, July 2, 1949

⚙️ **CALCIUM CHLORIDE** moisture absorption unit, for use to dry damp basements, rooms and closets, consists of a V-shaped basket to hold the salt and a deep metal drip-pan, which has a handle like an ordinary basket for easy carrying and to hold the salt container in place. A spout makes it easy to empty.

Science News Letter, July 2, 1949

⚙️ **PORTABLE DISHWASHER**, for the small family, is set when needed on the drain-board of the kitchen sink and attached to the hot water faucet with a length of hose. The dish-holding basket inside is rotated by four jets of water, and dishes are quickly washed by water pressure and soaking action.

Science News Letter, July 2, 1949

Do You Know?

The magnesium supply seems inexhaustible, it occurs world-wide in sea water.

Sulfuric acid is the main byproduct of the zinc industry, it is made with the sulfur gases given off in roasting the zinc concentrates.

The pectin necessary to make jelly gel can be bought in stores; reliance on the uncertain amount present in the fruits is no longer required.

When a way is found to give a moderate amount of ductility to ceramic and metal combinations, a whole new series of useful engineering materials will be available.

The U. S. Signal Corps is using in Alaska low-frequency, high-power radio transmission to decrease the interference with radio communications in the polar region that engineers call "auroral absorption."

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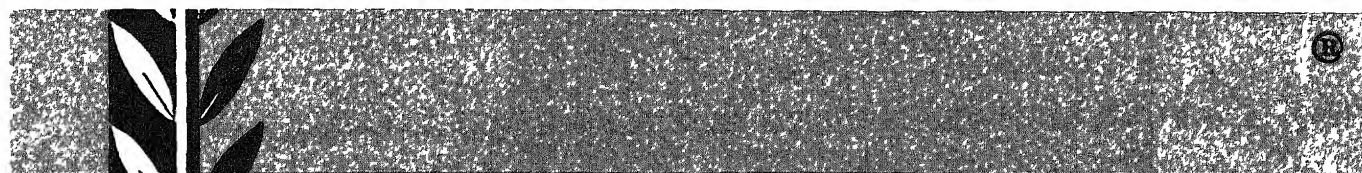
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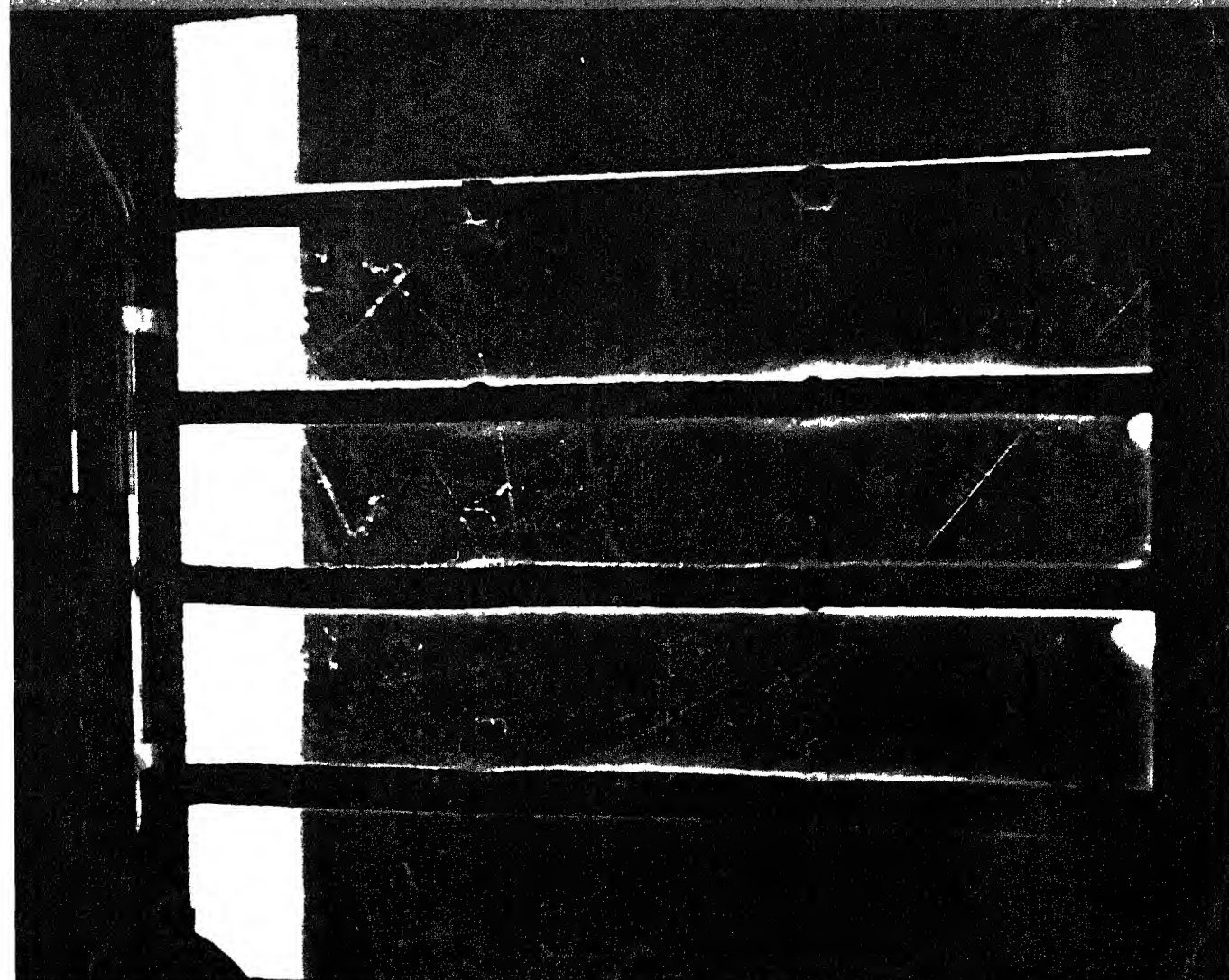
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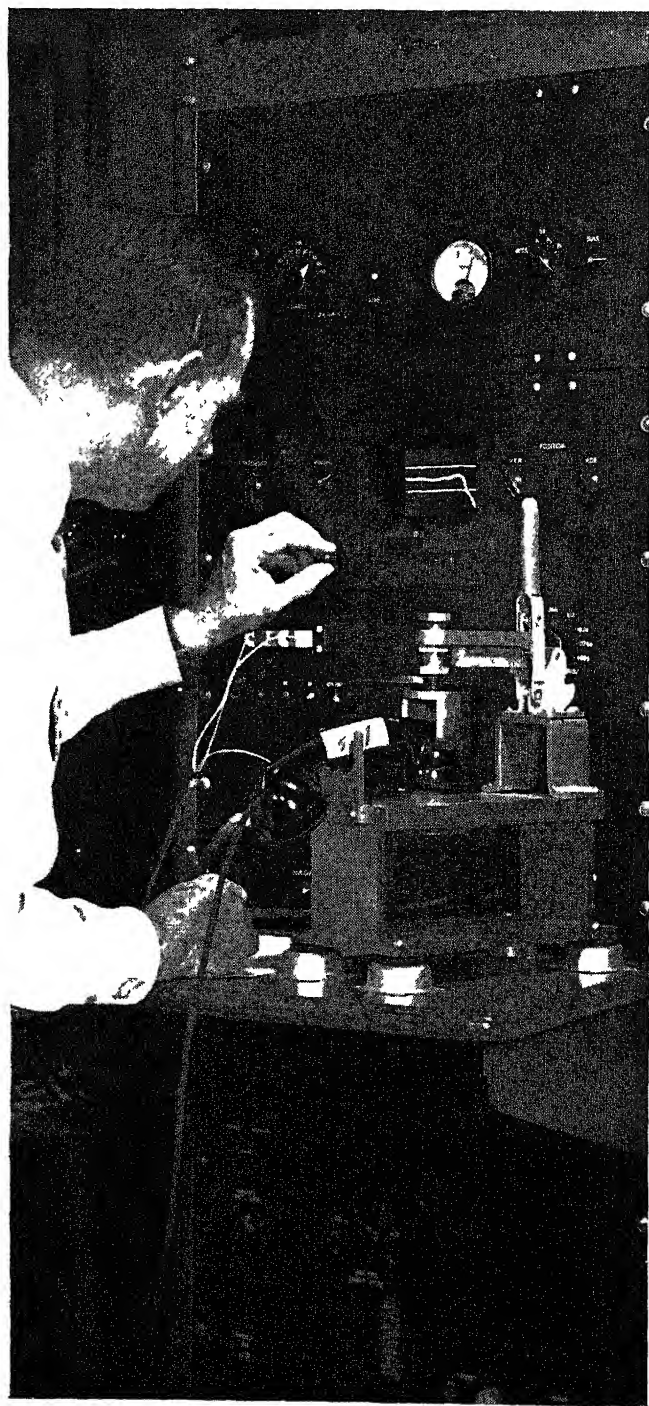


Imperial Library Cosmic Heavy-Weight
New Delhi. See Page 31

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YOUR telephone receiver should treat each tone in the voice alike, that is important to you, because proper balance makes pleasant listening and easy understanding. Naturalness in receiver performance is pictured in a matter of seconds by the apparatus shown at left.

The receiver is clamped in place and an oscillator feeds into it frequencies representing all talking tones. Then a bright spot darts across an oscilloscope screen leaving behind it a luminous line which shows instantly

**It listens so
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the receiver's response at each frequency. It is precise, and it is many times faster than the old method of measuring receiver performance point-by-point and then plotting a curve.

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NUCLEAR PHYSICS

Source of Cosmic Rays

The sun, magnetic dust between stars, or the explosions of stars called supernovae, are some of the proposed energy-sources for cosmic radiation.

➤ WHAT big guns of the universe bombard the earth with the powerful but invisible cosmic particles? The sun, the dust between the stars or even far away in cosmic space, are possible origins of cosmic rays described to the University of Denver International Cosmic Ray Symposium in Idaho Springs, Colo.

A few years ago there was no satisfactory explanation of the birth of these radiations. Now, scientists have the choice of two or more ways the rays can get started and pick up the immense energies they carry to earth.

Picture great clouds of dust in motion in the vast spaces between the stars, clouds so diffuse that they could never be seen if man were there to view them. These clouds set up magnetic fields that travel along with the dust particles. When a bit of dust collides with a cosmic ray particle the particle may disappear. But if a particle gets around in this region safely, it picks up energy as it leaves and in many collisions gets energy as great as the cosmic rays need to plunge, as they do, into the earth's atmosphere. This birth process may go on for millions of years.

Dr. John A. Wheeler of Princeton discussed at the Symposium this theory for which Dr. Enrico Fermi of the University of Chicago is largely responsible. New ideas that the Swedish astronomer, Dr. Hannes Alfvén, has put forth on energy in magnetic dust clouds have helped to produce this picture.

The sun, from which almost all other earth-received radiation comes, is the birthplace of most cosmic radiation as well, Dr. Edward Teller of the University of Chicago urged at the meeting. This allows the projectiles to get their energies closer to the earth. The radiation seems to come into the earth as it does because of the magnetic field of the earth.

To make the Teller theory work, it is necessary to have a sort of squashed-down magnetic field of the sun strongest in the plane of the revolving planets.

Still another theory is that the energy comes from tremendous explosions of stars called supernovae. Dr. Lyman Spitzer, Princeton astronomer, visualizes these explosions as shooting out immense amounts of radiation which strike the cosmic particles in such fashion as to give them the billion electron volts they need per unit particle in heavy atoms.

If the Fermi and Spitzer theories were both operated, they might explain every-

thing, as the cosmic magnetic dust birthplace is reasonable for the protons (hearts of hydrogen atoms) that arrive from outer space, and the Spitzer theory makes possible

NUCLEAR PHYSICS

Find Big Atomic Showers

➤ IMMENSE explosive showers of atomic fragments, splattering 200,000,000 particles over hundreds of acres, have been discovered in the earth's atmosphere. Each shower is caused by a single atomic bullet from outer space.

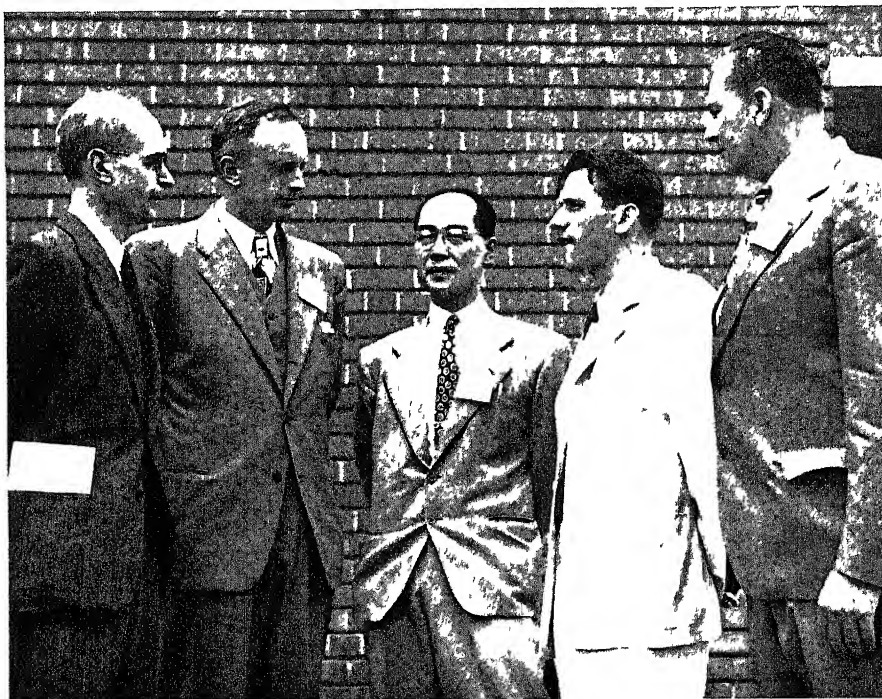
Announced to the University of Denver International Cosmic Ray Symposium in Idaho Springs, Colo., by Dr. Kenneth Greisen of Cornell University, these showers were detected by coincidental effects upon 200 Geiger counters in experiments at the Inter-University High Altitude Laboratory at Echo Lake, Colo., two miles above sea

level.

Only about once a week do such gigantic showers, approximately a mile across, get detected in one place, but smaller bursts occur about every second, probably causing the streaks of particles that are the cosmic rays detected.

"We are dealing with the highest energy ever discovered in individual atomic particles, a billion times greater than the energy that is let loose by the fission of a single uranium atom," Dr. Greisen explained.

The actual amount of the energy in the particle that enters the earth's at-



COSMIC RAYS ARE INTERNATIONAL—At the symposium in Colorado (left to right) Dr. Manuel Sandoval Vallarta of Mexico, Dr. Hugh Carmichael of the Canadian National Research Council, Dr. H. Yukawa of Japan, Dr. Oreste Piccioni of Brookhaven National Laboratory, Dr. Byron E. Cohn of University of Denver, host institution.

the hearts of heavy elements that have recently been found.

These cosmic rays can be thought of as messages from the parts of the universe that human beings can never hope to visit. They are another way of looking into the depths of the universe, supplementing the giant telescopes which receive a different sort of radiation for astronomers to study.

It is a toss-up as to what is more important, discovery of what the cosmic rays are and do, or discovery from the radiation of how the universe and matter are put together.

Science News Letter, July 9, 1949

mosphere and sets off a big shower is actually small and could hardly be felt if it were concentrated on one's head (a hundredth of a foot-pound). It is not useful, like the energy in the explosion of the atomic bomb, because there is no known way to concentrate and control the cosmic ray energies. But Dr. Greisen explains that discovery of the fission of this single uranium atom had to precede that great chain reaction that makes possible the atomic bomb.

The big showers happen in about 40 millionths of a second, and the entering particle is probably a proton, or heart of a hydrogen atom. The particles that are produced include all the fundamental par-

ticles, known as protons, electrons, neutrons, photons, various mesons, and neutrinos—the latter never actually discovered except by mathematical inference.

A husband-wife team of Italian scientists, Drs. G. Cocconi and V. Tongoigi (Mrs. Cocconi, now at Cornell) collaborated with Dr. Greisen in his research.

Another husband-wife pair of experimenters upon cosmic ray showers who reported their findings was Dr. and Mrs. C. G. Montgomery of Yale University. Other cosmic ray experts reporting on showers were Dr. Lloyd G. Lewis of Princeton and Drs. W. W. Brown and A. S. McKay of Cornell.

Science News Letter, July 9, 1949

was again picked up in 1948 and subjected to extensive laboratory tests to determine its value as a rodenticide.

Science News Letter, July 9, 1949

CHEMISTRY

New Rat-Killing Chemical

➤ A NEW rat-killing chemical, that does rodents to death by causing internal bleeding, has proved up well in field tests conducted by the U. S. Fish and Wildlife Service at the University of Florida, reports H. J. Spencer, Survey biologist. The 100% kill obtained earlier under laboratory conditions has been practically duplicated in the larger-scale tryouts.

The new compound, at present known simply as Compound 42, is a chemical relative of dicoumarol, the substance found in spoiled sweet clover that prevents the clotting of blood. It has a similar physiological effect, and thus starts and maintains fatal bleeding in the rats' abdominal areas.

Compound 42 does not kill at a single dose, as most other rodenticides do, four or five successive feedings are required. However, the effect is cumulative, and once a rat has eaten enough of it he is a "goner." Rats do not learn to avoid it, nor do they develop any tolerance.

Most effective mixture was found to be 46 grams—slightly more than one and one-half ounces—in 100 pounds of solid food

Four or five feedings of this mixture, over as much as a 12- to 15-day period, produced a practically total kill.

Field tests were made on both the common brown rat and the scarcer black rat. The black rat, though a smaller species, had four times the resistance of the brown rat, but the recommended mixture was sufficient to kill both species. Mr. Spencer is now testing Compound 42 on the house mouse.

Unlike the highly dangerous poison known as 1080, used in professional rat-eradication programs, Compound 42 is not harmful to larger animals or to human beings in the dosage recommended for rodents. Moreover, whereas 1080 has no antidote, the action of Compound 42, if accidentally swallowed in dangerous quantity, can be checked. This can be accomplished either by blood transfusion or by the administration of clot-promoting vitamin K.

Compound 42 was first isolated in 1943, in a search for anti-coagulant derivatives of dicoumarol. Shelved for five years, it

RADIO

Saturday, July 16, 3:15 p.m., **EDST**
"Adventures in Science" with Watson Davis, director of Science Service, over Columbia Broadcasting System.

Dr. Robert A. Millikan and Dr. Carl D. Anderson, Nobelists in physics at the California Institute of Technology, and other cosmic ray experts will talk about "The Mystery of Cosmic Rays."

SCIENCE NEWS LETTER

VOL. 56 JULY 9, 1949 No. 2

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NUCLEAR PHYSICS

Condon and Oppenheimer

At the International Cosmic Ray meeting these men were just physicists among physicists despite their prominence in recent congressional investigations.

➤ THERE were two front-page names among the scientists who gathered at the University of Denver International Cosmic Ray Symposium in Idaho Springs, Colorado—front page because they have tangled with a congressional committee and the FBI. They are Edward U. Condon and Frank Oppenheimer.

These are top names in science as well. Dr. Frank Oppenheimer, who has resigned his professorship at the University of Minnesota, received one of the few spontaneous bursts of applause at the very technical sessions devoted to unravelling the mysteries of the penetrating radiation from outer space that bombard the heights of Colorado's mountains, most conveniently for scientific study. He had just reported the discovery of a strange burst of radiation, a cluster of photographic tracks made by particles of electricity, electrons, that seemed to have no assignable origin such as ordinary cosmic ray explosions, usually have.

The significance of the applause was neither liberal nor conservative. It was just acknowledgment of a good job well done. Dr. Oppenheimer's colleagues had forgotten whether he had made any experiments years ago in communist politics, then much more respectable than now.

There was great concern among his fellow scientists that he go on with the important cosmic ray research that he has been doing for several years. This is jeopardized by his leaving the University of Minnesota staff. He does not know himself what he is going to do, but he and fellow physicists feel "the show must go on."

Dr. Condon—director of the National Bureau of Standards—whose name can hardly be mentioned in print without the smear tag, "appears to be one of the weakest links in our atomic security," was merely an eminent physicist among physicists, like a hundred others there.

It must not be assumed that these two men are not worried, hampered and harassed by what is happening to them. They are. And so were many attending the conference.

There is fear today that the freedom of investigation and expression that is inherent to the scientific method is disappearing from everyday life, under the excuse of security and loyalty. Will it extend some day to science, as it did in Germany and as it does in Russia? Is it any less important fundamentally in everyday life than it is in science?

If anyone were following the Communist line in this cosmic ray conference, he might

have been expected to make a defense of the claim put forth by two eminent Soviet scientists not long ago that there are 16 different kinds of mesons, which are cosmic ray particles. At most, four or five kinds are well verified by non-Soviet scientists.

Soviet cosmic ray experts would have been welcomed at the conference, if their government and ours were exchanging scientists these days.

There was no feeling of nationalism there. The cosmic rays rain upon the Urals and the Rockies. The cosmic ray experts are of many nationalities: Japanese, Canadian, Mexican, Chinese, Italian, Hungarian and many Americans, who have come to this country in almost every wave of immigration from the Puritans to the refugees from Hitler.

Science is strong because, as one scientist puts it, "We don't give a damn where it

is discovered or who discovered it, but only whether it is so."

Science News Letter, July 9, 1949

HOME ECONOMICS

Eating Too Fast? Try Candlelight

➤ CANDLELIGHT, celery, melba toast and artichokes were advised as devices for slowing the pace at which people, especially college students, eat.

The advice was given by Christine Ricker, director of university dining halls at Stanford University, at the meeting of the American Home Economics Association in San Francisco.

New foods, she finds, had best be introduced in combination with tried favorites on the same plate, if one hopes to have the students eat the new foods. Changing food habits at the college level, she admitted, is difficult.

Homemakers were advised at the same meeting to shop first and then plan their meals. This method for taking advantage of best buys at market was suggested by Dr. Velma Phillips, dean of the college of home economics, State College of Washington.

Science News Letter, July 9, 1949



COSMIC RAY SCIENTISTS—Three of the directors of the Inter-University High Altitude Laboratory on Mt. Evans, Colorado, confer during the Idaho Springs symposium sponsored by the Office of Naval Research and the Atomic Energy Commission. Left to right—Dr. Kenneth Greisen of Cornell, Dr. Byron E. Cohn of the University of Denver, Dr. Bruno Rossi of the Massachusetts Institute of Technology.



WIND TUNNEL FROM GERMANY—This is one of the captured tunnels shipped to this country which is now helping American guided missile development. Here a model is being mounted in the Naval Ordnance Laboratory rotary wind tunnel preparatory to a "blow." (See SNL, July 2, p. 6.)

ENGINEERING

Superior Weapons

➤ TRUE security consists in being as far ahead as possible of any unfriendly nation, Dr. Karl T. Compton, chairman of the government Research and Development Board and formerly president of the Massachusetts Institute of Technology, declared before an audience of scientists and government officials at the dedication of wind tunnels and ballistics ranges at the Naval Ordnance Laboratory in White Oak, Md.

He was reviewing lessons learned from the recent war and his statement referred to improved weapons. "It was the overwhelming production of airplanes, of cargo vessels, of bulldozers, of landing craft and radar, all handled by brave and skillful men, that enabled our forces to stop, then to drive back, and finally to overwhelm our enemies," he said.

"The importance of beating the enemy in the race for new technical developments had many illustrations," he continued. "We beat him with microwave radar and with strategic bombers. He beat us to the snorkel submarine and V-1 and V-2 types of bombs, if he had got these things going several years earlier, the war might have had a different ending."

"To a rather astonishing degree, in the public and even in the military mind, security has come to mean secrecy. Secrecy is one aspect of security, for it is evident that,

if we should freely broadcast all information about our new developments, we would permit our competitor to keep pace with us at relatively little expense to himself.

"Thus secrecy is the negative, or defensive, aspect of security. But if we sit tight and lock up our secrets, it will not be long before our active competitor forges ahead of us. So we must press forward the positive, or offensive, aspect of security by making rapid advances in our own science and its practical applications.

"Unfortunately secrecy and progress are mutually incompatible. This is always true of science, whether for military purposes or otherwise. Science flourishes and scientists make progress in an atmosphere of free interchange of ideas, with the continual mutual stimulation of active minds working in the same or related fields. Any imposition of secrecy in science is like application of a brake to progress."

Another lesson of World War II is the power of teamwork, Dr. Compton stated. The outstanding characteristic of the attitude of our people during the war was the determination to go all-out for victory. It was "total war" from top to bottom. It was national teamwork in an unprecedented sense. It brought national success, and it brought personal satisfaction. And,

he added, there was far better teamwork in our democratic country than in the totalitarian countries of our enemies.

The wind tunnels that were dedicated are of German origin (See SNL, July 2, p. 6). They were captured in Bavaria late in the war, dismantled and shipped to White Oak for the use of the American armed services in studying aerodynamics, and particularly in applications to guided missiles. They are the same tunnels in which the famous German V-2 rocket was developed.

Science News Letter, July 9, 1949

GENERAL SCIENCE

Economy Drive May Block Science Foundation

➤ THE Congressional economy drive, timed to the end of the government's money-year, may be the newest hurdle blocking a National Science Foundation.

A bill to establish the foundation has thus far failed to get approval of the House Rules Committee. Economy-minded members of the committee are understood to be balking at approval of the bill which would set up a new government agency for supporting scientific research and science training.

The House bill, introduced by Rep. J. Percy Priest, D., Tenn., and a similar one which passed the Senate in March do not appropriate any money, but they call for a foundation which would spend money. In his budget for the new fiscal year President Truman listed a total expenditure of \$15,000,000 for the proposed science agency, \$2,500,000 of appropriations and the remainder in contract authority.

Budget for the last fiscal year also included this estimate for the foundation, but the bill died in the House in the second session of the Eightieth Congress, after an earlier measure was vetoed by the President in 1947.

Science News Letter, July 9, 1949

ENGINEERING

Giant Magnet Assembled For New Atom Smasher

➤ WHAT is believed to be the largest magnet of its kind ever made has been assembled in Urbana-Champaign, Ill., for the University of Illinois' giant, new 300,000,000-volt betatron.

The laminated electrical transformer magnet for the new atom smasher is 23 feet long, six and a quarter feet thick and 13 feet high. It weighs 275 tons and was assembled by Allis-Chalmers from 70,000 sheets of magnet iron, each sheet being only 0.014 inch thick.

Dr. Donald W. Kerst, who developed this type of atom smasher and is directing the construction, estimates that the new scientific instrument is now half completed.

Science News Letter, July 9, 1949

MEDICINE

Chinese Anti-Germ Drugs

Tests of 45 Chinese drugs revealed that eight had antibiotic activity. However, although they check further growth of germs they do not kill them.

➤ EIGHT drugs commonly used in the Chinese practice of medicine have anti-germ activity of the kind that might class them with penicillin, streptomycin and other antibiotic drugs now commonly used in Western practice of medicine.

The antibiotic or anti-germ activity of the eight was found through tests of 45 Chinese drugs. The tests were made by Drs. H. Zanyin Gaw and H. P. Wang at the National Wuhan University, Wuchang, Hupeh, China. Dr. Wang is now teaching at Mount Holyoke College, South Hadley, Mass. Their studies are reported in the journal, *SCIENCE* (July 1).

Chinese drugs, they point out, are actually roots, stems, seeds, leaves or flowers of various higher plants which have been made very dry by a special process. When prepared for use, the dried material is cut in small pieces and boiled very slowly for two or three hours or longer. Drs. Gaw and Wang followed this method in preparing extracts of the drugs for their tests.

While penicillin comes from a mold, some newer antibiotic drugs have been obtained from higher plants, for example, tomatin from the tomato plant. This is what prompted the study of the Chinese drugs from plants.

The eight found to have anti-germ activity check the multiplication of the germs but do not kill them. Tests of the drugs on living human white blood cells show that they are not poisonous, which was to be expected, because prepared medicine is always given by mouth in Chinese practice.

Six of the Chinese drugs showed various degrees of anti-germ activity against *Staphylococcus aureus*, common germ of the family that may cause anything from boils to blood poisoning. The six are: Ta Huang from a leafy plant of the rhubarb family, Huang Lien from an herb, *Coptis*, sometimes used in garden borders, Hai Tung Pi from a crimson flowering coral tree, Shan Shu Yu from a variety of dogwood, Tsien Tsao from the same family as the dye-plant called madder, and Chi Hsueh Teng from a decorative shrub of eastern Asia.

Two other Chinese drugs showed anti-germ activity of relatively low potency against *Escherichia coli*, a germ normally found in the intestinal tract and often used in tests of the purity of drinking water. These two drugs are Mao Ken from a buttercup, and Peh Pu from plants allied to the lily family.

Science News Letter, July 9, 1949

METEOROLOGY-ENGINEERING

New Machine Makes Fog

➤ SCIENTISTS have developed a fog machine, with which any kind of fog can be made.

And now that they can make fog, they hope to be able to learn enough about it to disperse it efficiently, to design fog lights and beacons of better visibility, and possibly even to develop fog screens for military purposes.

The machine was developed in the University of California Institute of Transportation and Traffic Engineering, which is primarily interested in reducing accidents on land, sea and air. In some sections of California, fog is a major hazard of

private, commercial and military transport.

The scientists, headed by Prof. Dan M. Finch, an electrical engineer, first tried to use natural fog in their experiments. When the real thing proved to be too elusive, they set about constructing a machine which would produce the air pressure and temperature changes which give rise to fog in nature.

The machine is a double-walled tank, with windows for observation and photography. Warm or cold air is circulated through the jacket of the tank, depending on the kind of fog needed. Fog is made from cold or warm moist air poured into the inner tank from a connecting vapor tank.

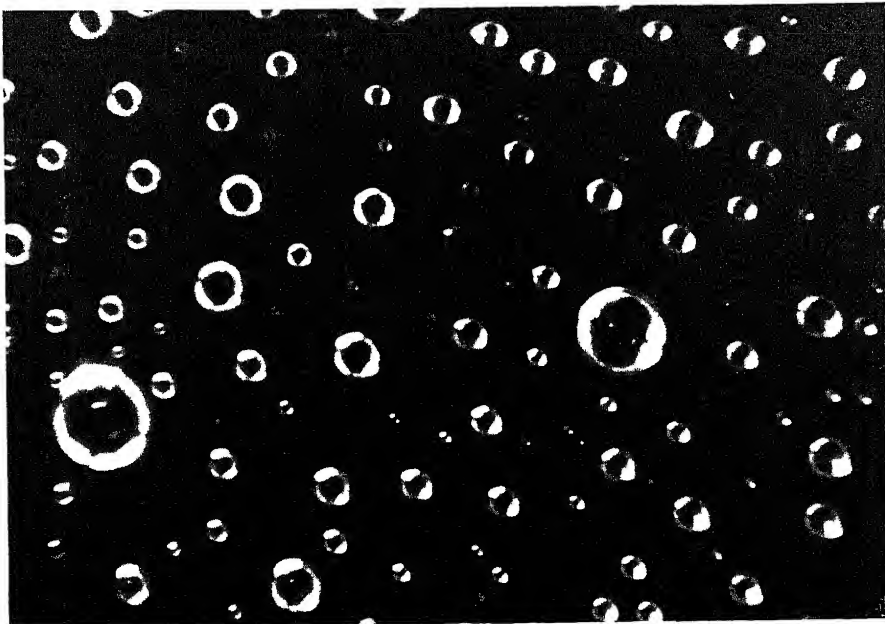
There are three principal types of fog: radiation fog, which occurs in valleys when the loss of heat to the ground through radiation produces vapor condensation; advection fog, which occurs along coastal areas when warm air from the water drifts in and mixes with air over a cold area; and pressure fogs, forming on hill summits when a saturated air mass moves up a hill and the resulting pressure changes cause the air temperature to drop below the dew point.

In the fog machine, for example, advection fog is made by a sudden mixing of warm saturated air from the vapor tank with a cool air mass in the fog tank. Pressure is changed by closing or opening an outlet valve.

Very little is known about the physical characteristics of fog, according to Prof. Finch. By using photomicrographic techniques with man-made fog, data on particle size, water content, temperature, density, dust content and composition of fog can be determined.

Better auto headlights, aircraft and other beacons, rail and highway signals, are the immediate objective.

Science News Letter, July 9, 1949



FOG DROPLETS—Magnified about 220 times, this photomicrograph of artificial fog droplets showed how they formed on a glass slide in the University of California fog machine.

MEDICINE

Synthetic Female Hormone Helps Men with Mumps

➤ A SYNTHETIC chemical with an effect like that of a female sex hormone is good medicine for men who get mumps, three Chicago physicians find.

The inflammation of the male sex glands which affects about one out of every five men who get mumps can be both prevented and relieved if it develops by this drug.

The drug is diethylstilbestrol. Its use at the Cook County Contagious Disease Hospital is reported by Drs. Archibald L. Hoyne, Jerome H. Diamond and Joseph R. Christian in the *JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION* (June 25).

The fact that the sex gland inflammation, which is the severest complication of mumps, is almost never seen in children suggested that temporarily suppressing normal sex gland functioning in men might be helpful in mumps. The female hormone-like action of the synthetic drug, the doctors reasoned, might therefore be useful.

They gave the drug as a preventive to 20 men who had had mumps for from one to four days without symptoms of sex gland inflammation, called orchitis. Among the first 13 given this treatment, mild orchitis developed in two and moderately severe orchitis in one. The next seven patients were then given twice as much of the drug each day. None of them developed orchitis.

Larger doses were given to 19 men who had already developed orchitis. The results were in some cases "dramatic" with decided decrease in pain and tenderness within 24 hours. Every patient made "an uneventful recovery." The average patient was treated for about four days and was able to leave the hospital in about five days.

The drug is given by mouth in a capsule which, the doctors point out, makes it easy to take and it has no toxic effects. Preventive treatment is continued until the jaw-swelling of mumps has subsided.

Similar good results with this treatment, the Chicago doctors found, had been reported earlier by another physician.

Science News Letter, July 9, 1949

AERONAUTICS

Thrust Power in Jet Engine Double That of Weight

➤ TWO and a half pounds of thrust for every pound of engine weight is the rated power for a new Westinghouse jet engine released from former Navy secrecy. It is already in use in the Navy's McDonnell Banshee, a fast-climbing shipboard fighter for fleet operational units.

The Banshee is equipped with two of these engines. A pair of them also provide jet power for the Air Force's newest plane, the Lockheed F-90 penetration fighter, de-

signed to operate deep in enemy territory against enemy aircraft and ground targets. The F-90 is a speedy plane, with 35 degrees of wing sweep-back.

This so-called J-34 is 10 feet in length and weighs about 1,200 pounds. Airplanes equipped with two of these jet engines will have more than 10,000 horsepower at command, because at modern flight speeds the engine's thrust is equivalent to better than 5,000 horsepower.

At a standstill, the slim engine sucks in air in the front end at 250 miles an hour, and spits it out the jet nozzle at the rate of 1,200 miles an hour. The compressor and the turbine of the engine whirl 12,500 times a minute to pack the 100 tons of air the engine "breathes" every hour.

Science News Letter, July 9, 1949

MEDICINE

Gamma Globulin Checks Animal Virus Disease

➤ THE blood's germ-fighting gamma globulin saved a woman who was dangerously sick with a brain disease when other treatments, including penicillin, had failed.

The patient had Western equine encephalomyelitis, popularly known as horse sleeping-sickness. This virus disease affects the brain and central nervous system of horses, and is transmitted to humans by mosquitoes and other insects. Besides horses, chickens and birds are believed to harbor the virus.

The patient was extremely ill with headaches, chills and fever. Drs. William Saphir and Albert Milzer of Chicago report in the *JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION* (July 2).

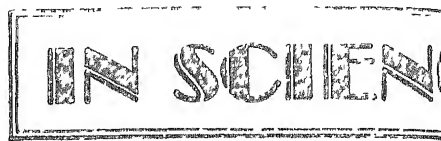
Trial treatment with quinine was unsuccessful. Penicillin also had no effect, and the patient became worse.

Research by other scientists showed hyperimmune rabbit serum to be good in this disease. Since this serum was not available, the physicians hopefully administered gamma globulin from human blood. It was injected into the muscles daily for seven days in large dosages. The doctors noted that gradual and distinct improvement followed with eventual recovery.

They tested the gamma globulin administered to this patient and discovered that it contained neutralizing antibodies against the disease. However, since different batches of gamma globulin will have varying virus-killing properties, depending on the source of the blood, they feel that a special preparation of gamma globulin fraction of hyperimmune rabbit serum would be more suitable for use in human patients.

It was impossible to discover how the patient had contracted the disease since she lived in Chicago and had not left the city for several years. As far as was known, she had not come in contact with any sick animals.

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BIOCHEMISTRY

Radioactive Silk Spun From "Tagged" Compounds

➤ RADIOACTIVE silk has been spun by two moth larvae, in experiments reported to the journal, *Science* (June 24), by a four-person research team.

Interest centered not in silk as a fiber or fabric but in silk as a chemical compound, it is explained. Silk consists largely of a protein called fibroin, which can be used in research as typical of all protein, which may be considered the chemical basis of life itself. Hence the interest in getting a radioactive "tag" attached to it, for purposes of identification in various stages of its chemical life-history.

The silk was spun by the caterpillars of the big Cecropia moth, one of the first natural-history objects collected by most children. Small amounts of two amino acids, glycine and alanine, "tagged" with radioactive carbon 14, were injected into the two fat larvae. About 24 hours later they started to spin their cocoons.

Radioactivity of the silk in these cocoons was proved in three ways: by the ticking of a Geiger-Müller counter; by photographic "autographs" left by fibers and clipped bits of silk placed in contact with camera film; and by elaborate chemical analysis.

The silk-spinning glands were dissected out of two other caterpillars and kept for several hours in a solution containing the radioactive carbon. Subsequent analysis of their proteins also showed the presence of radioactive silk substance.

These experiments were performed by Drs. Paul C. Zamecnik, Robert B. Loftfield, Mary L. Stephenson and Carroll M. Williams, of the Collis P. Huntington Memorial Hospital and Harvard University.

Science News Letter, July 9, 1949

GEOLOGY

Radioactive Carbon May Help Set Ice Age Dates

➤ RADIOACTIVE carbon in bones, shells and wood left behind by animals and plants that died during the latter part of the Pleistocene ice age may help materially in dating geologic events of 35,000 years ago. In the journal, *Science* (June 24) Prof. Richard Foster Flint, Yale University geologist, invites colleagues who have materials of this kind to send him exact descriptions, with a view to later analysis to determine their age.

Science News Letter, July 9, 1949



MEDICINE

Strange Blood Cells Found In Atom-Smasher Workers

➤ TWO unusual kinds of white blood cells have been found in the blood of persons working with the 130-inch cyclotron in Rochester, N. Y.

Whether they are the result of exposure to atomic rays from the atom-smasher has not yet been determined. If so, they might serve as indicators of radiation damage. Further studies of the cells are being pushed by Drs. M. Ingram and S. W. Baines, working at the University of Rochester under a joint program of the Atomic Energy Commission and the Office of Naval Research.

One of the unusual white blood cells is a very early, or young, cell of the kind called mononuclear, meaning it has only one nucleus. The other is a white blood cell which seems to have a bi-lobed or double nucleus.

Both kinds of cells, the scientists report to the scientific journal, *PHYSICAL REVIEW* (June 1), have been found in persons not associated with cyclotrons but who were suffering from sore throats or other infections. The cyclotron workers, however, had no infections. And the bi-lobed or double nucleus cells have not, so far as the Rochester scientists could find, been previously seen in normal blood.

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NUCLEAR PHYSICS

Navy Ship Is Balloon Base For Cosmic Ray Studies

➤ GEIGER counter "telescope," and other scientific equipment, held aloft by balloons and controlled from aboard a Navy ship, will be used in a new series of cosmic ray experiments during July and part of August.

Two groups of Princeton University scientists will conduct the experiments aboard the U. S. S. *Norton Sound*, which sailed from the West Coast around July 1.

The cosmic ray "telescope" are Geiger counters which detect cosmic rays as they strike them from narrow angles in the direction which the counters are pointed. Sent high overhead by balloons, the counting "telescopes" will be pointed by remote control from the ship and data received by radio.

Scientists conducting the experiments are Dr. John R. Winckler, George Neilson Whyte, Thomas Howard Stur, Kirby Dwight, Jr., Robert Price and W. E. Rapp, all of Princeton, and Robert J. Sabin, on leave from the University of New Mexico,

and Dr. Ira Meyers of the Department of the Army Signal Corps.

Dr. Winckler will direct a study with the "telescopes" of energy distribution of the primary cosmic rays and relative numbers of rays having positive and negative electrical charges. Another group, headed by Mr. Whyte, will investigate the number and size of nuclear explosions due to cosmic rays at different altitudes and the number of slow neutrons in the atmosphere at different altitudes. Ion chambers and special neutron counters will be sent up by the balloons for these experiments.

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ASTRONOMY

Pale Green Sun (Not Moon) Is Observed by Scientist

➤ THE SUN (not the moon) was seen as pale green just before its rim slipped below the horizon on an evening in February. The observer was Dr. E. O. Hulburt, physicist of the Naval Research Laboratory, who specializes in the optics of the atmosphere.

Dr. Hulburt reports the occurrence and also gives his explanation for it in a brief report to the *JOURNAL OF THE OPTICAL SOCIETY OF AMERICA* (May).

He saw the green sun while flying in an airplane at an altitude of about 8,000 feet above a complete cloud cover about 2,000 feet below. The air was very clear, Dr. Hulburt reports, right down to the blanket of clouds. This is important for observing a green sun. If the sun appears red as it begins to sink below the horizon, you can be sure you will not see the disappearing rim as green, because when it looks red it is because the blue and green portions of the spectrum are filtered out by the atmosphere.

On this particular evening, the sun was a pure yellow as it began to dip below the cloud-sky horizon. Just before the last segment slipped from view it turned from yellow to white and finally to a distinct green.

The color lasted very briefly and might easily escape casual observation. It lasted, Dr. Hulburt estimates, not more than three seconds or less than two.

The prismatic dispersion of the normal atmosphere for a ray tangent to the surface of the earth is 22 seconds of arc, and at 6,000 feet altitude where the pressure is about 0.8 atmosphere, it amounts to about 18 seconds of arc. The observed time of about two seconds, which elapsed from the appearance of the green segment to its disappearance below the horizon corresponded to an angular motion of the sun of about 23 seconds of arc. This was near enough to the calculated value of 18 seconds of arc, Dr. Hulburt concludes, to indicate that the dispersion of the normal atmosphere was adequate to account for the sun's looking green.

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NUCLEAR PHYSICS

New Kind of Trap Built For Cosmic Ray Studies

➤ A NEW kind of trap for cosmic rays that bombard the earth from outer space was announced to the University of Denver International Cosmic Ray Symposium in Idaho Springs, Colo., by Dr. J. Warren Keuffel of Princeton University. It permits scientists to look inside a large mass of matter and see, by means of spark signals, just when and where the intruding particles explode the hearts of atoms they smack into here on earth.

It gives one more tool for use in puzzling out one of the universe's major mysteries: the structure of atomic particles and the composition of the far-distant parts of the universe that give birth to the most powerful radiation that man has ever detected.

The new parallel plate counter stack is a pile of ten steel plates, each a half-inch thick. Each plate fires a counting device within five-billionths of a second of the impact of the cosmic ray. In addition to electronic counting devices, cameras focused on the spaces between plates can photograph the sparks that mark the passage of the particle. The heavy ion stops and decays many more particles, because it is heavier than air used in conventional cosmic ray counters.

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GENERAL SCIENCE

Awards Go to Scientists For Work with Hormones

➤ THE discoverer of the growth hormone and the scientist whose studies have revealed the effect of a hormone now believed effective against arthritis, were singled out for honors by the Association for the Study of Internal Secretions in New York.

Dr. Herbert M. Evans, director of the Institute of Experimental Biology, University of California, was given the F. R. Squibb and Sons Award for his contributions to knowledge of the trophic hormones of the pituitary gland and his discovery and purification of the growth hormone.

Dr. George Sayers of the University of Utah Medical School received the Ciba Award for studies showing the effect of the adrenocorticotrophic hormone of the pituitary gland on the adrenal glands which are situated above the kidneys.

Selection of Dr. George M. Brown, Jr., as the Ayerst, McKenna and Harrison Fellow, and of Dr. D. Lawrence Wilson, as the first recipient of the newly established Scheering Fund Fellowship, was also announced by the association. Dr. Brown will work at the University of Pennsylvania and Dr. Wilson at the Harvard University Medical School.

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BOTANY-CHEMISTRY

Poison Ivy Is Perennial Pest

A new chemical, 2,4,5-T, is the latest weed-killer found effective against poison ivy. It is related to 2,4-D but is considered an improvement over it.

By DR. FRANK THONE

➤ POISON IVY is a perennial pest, in a dual sense. In the literal, botanical meaning of the word, poison ivy is a perennial plant: its glossy-green but evil-laden leaves come forth thickly year after year on woody branches of a myriad-rooted vine that climbs up tree-trunks and over rocks or trails along just under the ground surface as a long, snaky rootstock. It overruns and smothers out wildflowers and shrubs, finally monopolizing the ground in woodlands where the overhead canopy is not fully closed.

Perennial, too, are its painful effects on its victims, for no one who is sensitive to poison ivy ever acquires a natural immunity. Moreover, susceptibility to ivy poisoning appears to be a definite hereditary trait, passed on from parent to offspring through generation after generation. It might be likened to the doctrine of Original Sin in reverse—a kind of undying Original Innocence, exposing its unfortunate possessors to itching, blisters and general misery every summer of their lives.

Some Are Immune

There are some lucky individuals on whose resistant hides poison ivy has little or no effect. However, they are outnumbered more than two to one by those who suffer after every contact. Such resistance or immunity cannot be guaranteed permanent, either; a heavy exposure to the weed may break it down, and once lost it is never regained.

Small wonder, then, that poison ivy is dreaded and hated everywhere, and that some people hesitate to enjoy outdoor fun for fear of having literally to pay for it through their skins. For such super-sensitives, however, the past few years have brought good news.

Poison ivy used to be considered just about impossible to kill. Older chemicals, that would make a quick end of most weeds, would merely wither the leaves on poison ivy, and the dead foliage would soon be replaced with more, just as bad as the first. During the war years, however, two weed-killers were developed that proved quite effective against the three-leaved pest. Ammate and 2,4-D were the convenience-names under which these were finally offered to the public.

This year a new compound is being marketed which is claimed to be a definite improvement over 2,4-D as a killer of

woody growths. It is chemically related to 2,4-D, and is tagged 2,4,5-T for short. Spelled out in full, it is 2,4,5-trichlorophenoxyacetic acid. But even chemists and weed eradicators don't stop to recite all that 2,4,5-T is enough. It is commonly sold in ready-mixed preparations, with directions for dilution and use printed on the label. Each manufacturer of course uses his own trade-name, but the actual formula will also be given.

Ammate, incidentally, is by no means out of the running. Some long-experienced veterans of the weed war still declare it's the best poison-ivy poison there is. It costs more than either 2,4-D or 2,4,5-T, but they say it's worth the difference, especially where quick results are wanted, as around yards where children play, or in the immediate vicinity of summer camps and cottages.

There is, of course, no way of getting rid of all poison ivy. It is just too abundant and widely distributed. All you can do is spray it to death where exposure of human skin to its venomous leaves is most frequent.

Best treatment for poison ivy is the absent treatment. Learn to recognize it—and shun it. You don't have to be a botanist to know poison ivy when you see it; that compound leaf with the three leaflets is its trademark. If you see such leaves on twiggy, many-rooted vines that climb up things, or on shrubby growths from knee- to shoulder-high rising out of the ground, stay away from them. "Leaflets three, let it be!" is an old but good rhymed rule to remember.

Poison ivy is one of the most widely distributed plants in North America. It ranges from Canada south to Florida, westward until it meets the deserts of the Southwest, northwestward to Puget Sound. There its range overlaps that of the Pacific Coast species, commonly known as poison oak. Actually, the two look so much alike that it takes a Ph.D. in botany to tell them apart—and some trained botanists aren't too sure that there is any real distinction.

There is a third member of this Boigian cousinship, poison sumac. This looks very much like the beautiful tall sumac that touches brushy hillsides with flame in autumn. However, it grows only on the wet borders of acid-water bogs, where most people would not think of going picnicking, so there is less need to worry about running into it.

Botanically, this triad of pests is a closely related clan. Poison ivy is not a real ivy,

and poison oak emphatically not an oak, but poison sumac is a true sumac—and so are the other two. Like every large family group, the sumacs have some disreputable members, and these three are the black sheep of the sumac tribe. Although poison ivy, poison oak and poison sumac are all strictly American in their range, there are other poisonous sumacs in foreign lands, especially in the tropics. Most notorious of these overseas "baddies," however, is another temperate-zone species, a tall shrub or small tree that grows in Japan and China, and is the source of the beautiful lacquer much admired on Oriental furniture and art objects.

Toxic Principle

The toxic principle in all these poisonous members of the sumac tribe is an oily, non-volatile substance first identified by a Japanese scientist near the beginning of the present century. He gave it the name "urushiol," from the Japanese word for the lacquer-producing tree, which is "urushi no ki."

The fact that this poisonous substance is non-volatile, that is, not readily turned to a vapor, surprises some persons who have the idea that poison ivy or poison oak can harm their sensitive skins even if they don't actually touch the plant. This seeming action-at-a-distance is easily explained.



POISON IVY—This is a close-up shot of the leaves from the under side. Note the cluster of tiny, inconspicuous flowers near top of stem. Some botanists state that the poison is most virulent when the plant is in bloom.



POISONING THE POISONER—Here one of the new chemical killers of poison ivy is being applied with a pressure-spray outfit.

able, when it is understood that touching objects that have in turn touched poison ivy can transfer the poison in sufficient quantity to start the mischief on more-than-ordinarily sensitive skins.

If you pet a dog or cat that has been running through poison ivy, or work with garden tools that have brushed against it, even toss up a tennis ball that some hardy immune person has retrieved out of a patch of the weed, you may start a case of ivy poisoning. Although the smoke from burning poison ivy or poison oak that has been grubbed up and dried cannot cause poisoning, it is apt to contain small bits of unburned leaf or bark material capable of causing blisters.

Proposed remedies for ivy poisoning have been listed literally by the hundreds. They range all the way from juices from various crushed herbs, supposed to be "old Indian remedies," to concentrated solutions of photographer's hypo. No one single treatment appears to be good for everybody, but there is one that has been used for

more than a generation with good success by large numbers of persons known to be sensitive. This is the so-called "iron treatment."

It consists of a five percent solution of ferrous sulfate, or copperas, in a half-and-half mixture of water and alcohol, plus a little glycerin, if desired. In contact with the poison, the iron combines with it to form an insoluble, non-irritating compound.

While this can be sponged onto ivy-poisoned skin after the damage has started, it is still better to use it as a preventive. You just wash it freely over all exposed skin surfaces and let it dry "as is," before you go into places where poison ivy or poison oak is likely to be encountered. Then the poison is immediately contacted by the iron salt when you brush against the plant, and it never gets started. There are a few hyper-sensitive skins that cannot be thus protected, but for a majority of ivy-susceptible persons this solution is a suit of invisible iron armor.

Science News Letter, July 9, 1949

MEDICINE

May Check Pregnancy Ill

➤ **EXPECTANT** mothers of the future may be saved from a dangerous, often fatal disease, thanks to a "happy accident" discovery by Dr. Alexander Symeonidis, special research fellow of the National Cancer Institute.

The disease is eclampsia. It accounts for between one-sixth and one-fifth of all maternal deaths in the United States. High

blood pressure, impaired kidney function, abnormal accumulation of fluids in body cavities and convulsions are symptoms of this disease which attacks late in pregnancy and often causes death of the unborn baby as well as the mother.

Injections of a female hormone, progesterone, which is essential to pregnancy, caused symptoms and tissue changes in

rats late in pregnancy that are strikingly similar to those found in human eclampsia, Dr. Symeonidis discovered.

At the time he made this discovery he was investigating the role of the hormone in breast cancer. Whether tumors will also develop in the rats, as expected, is still being investigated.

The accidental discovery of the relation between the hormone and eclampsia, however, is considered a step toward discovery of the cause of this disease which has defied doctors and killed mothers for thousands of years. Once the cause is definitely established, there is hope for more reliable means than now available for curing or preventing the condition.

Dr. Symeonidis believes that the eclampsia in the rats was the result of an unbalanced condition between the ovaries, pituitary gland and placenta induced by high doses of progesterone at a critical stage of late pregnancy. As an alternative, he points out that poisonous substances produced in the damaged placenta might be responsible. Evidence for this theory is the fact that some of the rats recovered after discharging dead embryos and damaged placentas.

The accidental nature of Dr. Symeonidis' discovery, made in the course of cancer research, is somewhat ironic. In a series of experiments in 1936 in Germany he tried unsuccessfully to produce eclampsia in animals.

Science News Letter, July 9, 1949

MEDICINE

Super-Intensive Treatment Effective for Epileptics

➤ **GOOD** results with a super-intensive treatment of epilepsy were reported by Dr. Tracy Putnam of Los Angeles at the meeting of the American Neurological Association in Atlantic City.

The super-intensive treatment was designed for patients not helped by the usual and less rigorous methods of treatment. Modern drugs, special diets, exercise and other measures fail to control the seizures, commonly called fits, in from 10 to 30 out of every 100 epileptics, Dr. Putnam stated.

In the new treatment, patients were put to sleep with one of the modern sleeping medicines and kept asleep for three to six days. This was supplemented by daily doses of phenytoin or other of the modern anti-epileptic drugs. Glutamic acid, a chemical once reported effective in stimulating intelligence, a special diet and inhalations of carbon dioxide were also given in what Dr. Putnam termed "hyperintensive treatment."

All five patients treated showed some improvement. Two continued to have attacks but had them less often. And they showed improvement in personality. The other three patients have remained free of attacks for periods up to a year.

Science News Letter, July 9, 1949

MEDICINE

Relieve Stings and Bites

➤ BEE STINGS and insect bites can be successfully treated with an ointment containing one of the anti-allergy drugs, Dr. William Theodore Strauss of Upper Montclair, N. J., reported in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (June 18).

The anti-allergy drug in the ointment he used is called thephorin. Technically, it is an anti-histamine drug. Most modern anti-allergy drugs are anti-histamines, because the symptoms of hayfever and other allergies are believed due to overproduction of histamine in the body.

Dr. Strauss believes that too much histamine is the cause of the pain, swelling and other symptoms following bee stings and some insect bites.

"One particularly interesting case" Dr. Strauss reports is that of T. S., a five-year-old boy who accidentally walked into a swarm of bees.

He got seven bee stings, four on the right leg just above the ankle and three around the left ankle. Within a few minutes the doctor had put thephorin ointment on the stings and surrounding skin. The little boy stopped crying within a minute and said all the pain had disappeared. A little later, playing in the same area, he got

another sting on his right thigh. This also was quickly relieved by the ointment. There was no swelling and the only signs of the stings were pinpoint spots where a drop of blood had been drawn at the actual site of the sting.

In each of seven other cases, including several of ant bites, the intense pain and stinging sensation was relieved within one or two minutes after the ointment was put on. One patient said the pain seemed to

"melt away."

The intense pain from "bites" of hornets, wasps, mosquitoes and ants can also be relieved by thephorin ointment, other doctors have told Dr. Strauss.

An allergic reaction to the protein of the bee venom, rather than inflammation from the acid, is the cause of the pain, swelling and occasionally more severe symptoms from bee stings in Dr. Strauss' opinion. There is no longer any place, he says, for such old-fashioned treatment of bee stings and insect bites as ammonia, soda or mud packs.

Science News Letter, July 9, 1949

NUCLEAR PHYSICS

Cut Atomic Casualties

➤ A TEN-MINUTE warning that an atomic bomb will drop can reduce the casualties of a normal city ready for atomic attack from 100,000 to 10,000, Dr. R. E. Lapp, ONR physicist and author of *Must We Hide?*, told the Western Safety Conference in Portland, Ore.

But no government agency is actively educating the public on atomic warfare, Dr. Lapp warned. Unless the public is convinced that we can deal with atomic attack, which he estimates may come within five years of 1960, we may have a disastrous, Orson Welles exodus from cities threatened with atomic destruction.

Underground shelters can protect against an atomic explosion, Dr. Lapp declared. He feels that the terrors of radiation have been vastly overemphasized. Radioactive remains of an atomic bomb detonated in the air, as at Hiroshima, are swept up into the stratosphere where they are dispersed harmlessly. The ground beneath is not made uninhabitable, and contrary to common fears, people can reoccupy the area. Dr. Lapp also discounted the dangers of underwater atomic explosions spraying lethal doses of irradiated water, because deep water in which to drop the bomb is lacking at most cities.

Cities should be planned so that they are not the ideal atomic bomb targets that they are today, he told the safety meeting. The cluster of tall buildings in the center of about 20 American cities, each of more than half a million population, is the vulnerable heart of such populations.

One bomb dropped on Manhattan and properly detonated over one of the two clusters of skyscrapers could kill 200,000 and injure a like number, he estimated.

Nevertheless, if we undertake to defend our cities, Dr. Lapp said, an enemy could not cause the capitulation of this country even though our principal cities were bombed with 200 bombs and 10,000,000 people killed if no precautions were taken.

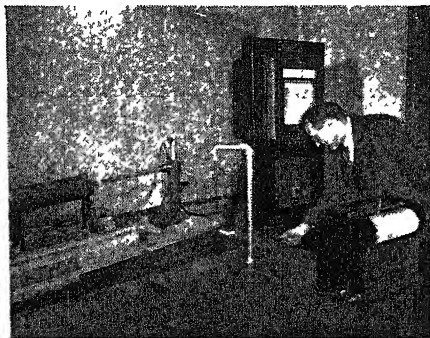
To be successful, an enemy must destroy America's ability to fight back, Dr. Lapp declared. An aggressor nation with atomic

bombs would not attack cities indiscriminately, in Dr. Lapp's opinion, but the bombs would be concentrated on American industries that would allow us to strike back immediately. Bombs would not be wasted upon the huge American steel industry, the critical Soo locks vital to transporting iron ore or even the atomic energy installations, such as Oak Ridge. Instead, Dr. Lapp believes that if the enemy knows its stuff it would be concerned about the atomic bombs we have stockpiled and not those which we could make in the next year. The enemy would attempt to destroy the factories making items essential to our striking back, or the depots and transportation bottlenecks that would be sorely needed in our own atomic counteroffensive.

No critical industry should be concentrated at any one location where it could be knocked out by one atomic bomb, Dr. Lapp warned.

"No magic defense against the atomic bomb will be invented," Dr. Lapp declared. No reputable scientist believes that an instrument or machine will be invented which will explode atomic bombs prior to their intended time of detonation."

Science News Letter, July 9, 1949



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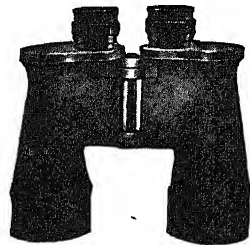
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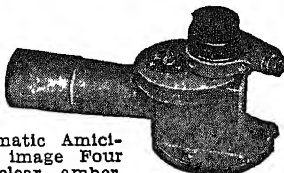
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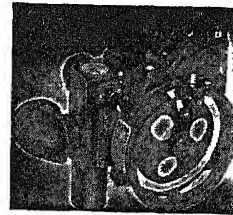
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NATURE RAMBLINGS

by Frank Thone



America's Cherubim

➤ FROM bison to bodiless child-angels may seem a very far cry, yet there does seem to be a fairly continuous chain of descent. The majestic winged human-faced bulls that guarded the gates of palaces and temples in ancient Mesopotamia were known by the Semitic name from which our word "cherubim" is derived. Because of their

bellowing voices, thunderclouds were imagined by the ancients as flying bulls, the steeds of the highest of the gods.

Originally, these winged bulls were the old-world species of bison, or wisent, now all but extinct. Known in the earliest times in the Tigris-Euphrates valley, they had disappeared long before Babylon grew great. Hence the conventional representations had bodies more like those of domestic cattle. Yet their origin is traceable in their curved horns, symbols of power, and in their beards.

How these fabulous cloud-bulls were transformed into the second-highest order in the angelic hierarchy might be a long story. Sufficient to suggest here that the "cherubims" (a false plural, by the way) described with meticulous detail in the twenty-fifth chapter of Genesis are believed by some archaeologists to have been images much like those surviving in the Mesopo-

tamian ruins—proper seat for the God who was above all gods. And since images must not be made of Him, soon images were no longer attempted of them.

The puckish mischance by which the cherubim, after they had become very great angels, were further transmogrified by modern fancy into the littlest of angels—often consisting of head and wings only—is still another story. But from the mighty cherubim of antiquity to the "sweet little cherubs" of modern picture-cards (and sometimes tombstones) is surely a strange evolution!

Yet you can catch a fair glimpse of how it all started, the next time you visit the Zoo, or better yet, ride through Yellowstone National Park. Just wait until one of the majestic old bison lifts his head and looks at you. Isn't there something hauntingly near-human in the look of that horn-crowned, bearded face?

Science News Letter, July 9, 1949

ENGINEERING

Magnetic Survey for Ores

➤ SURVEYING the crust of the earth for possible hidden metal ores and petroleum with magnetic instruments has proven its worth, the UNSCCUR will be told at its August meeting at Lake Success, N. Y., by J. R. Balsley, Jr., of the U. S. Geological Survey. He will base his statements on the experience of the Survey over years with the ground-based instrument and experience of the past five years with the airborne magnetometer.

The airborne magnetometer was used during the war floating through the air under and behind an airplane to detect submerged enemy U-boats in the Atlantic ocean. Its findings passed in electric signals to the plane by means of the trailer cable. During and since the war, this type of airborne instrument has been used to survey many thousands of square miles of territory in a search for hidden minerals, and particularly for geological formations in the crust of the earth favorable for petroleum.

UNSCCUR is an international organization promoting worldwide developments through the interchange of scientific knowledge. Its full name is the United Nations Scientific Conference on the Conservation and Utilization of Resources.

The airborne magnetometer is, according to Mr. Balsley, a high-speed, low-cost reconnaissance geophysical instrument which can be used to produce magnetic maps of the same order of accuracy as those produced by ground magnetic instruments.

It is not well suited for making small detailed surveys or for use in mountainous areas. It is particularly useful in areas which are difficult to traverse on foot, and in combination with radio and radar location systems can be used to conduct surveys over water or other unmapped areas.

The over-all accuracy of the results of the airborne magnetometer can be most easily discussed by comparison with that of the more familiar ground magnetometer of the Schmidt type, he will say. The results of the aeromagnetic survey are compiled into a magnetic contour map or a series of magnetic profiles of the same type as those obtained by ground methods.

Although geophysical ground magnetic surveys usually measure variations in either the vertical or horizontal components of the earth's magnetic field, aeromagnetic surveys measure variations of the total field. In practice the two methods do not compete but complement each other.

Science News Letter, July 9, 1949

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Words in Science— BENZINE-BENZENE

➤ BENZINE and benzene are not alternate spellings for the same word, they are completely different chemicals.

The fluid you sometimes use to clean spots from your vest is benzine. Like benzene, it is colorless and inflammable. It is derived from crude petroleum by fractional distillation, and is a mixture of various hydrocarbons.

Benzene, which is the starting point in the manufacture of compounds of the benzene series, is not a mixture but a single compound, obtained chiefly from coal tar. It is used in the manufacture of organic chemicals. Benzene is another word for benzol.

Science News Letter, July 9, 1949

Books of the Week

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AMERICAN WILD FLOWERS—Huold N. Moldenke—*Van Nostrand*, 453 p., illus. \$6.95. Describes and illustrates America's favorite wild flowers from coast to coast and from Canada to Mexico. Written for everyone interested in natural history.

CLASS SIZE The Larger High School—Ellsworth Tompkins—*Gov't Printing Office*, 29 p., illus., paper, 20 cents. Furnishes information basic to the consideration of class size.

COCHISE AND MOGOLLON STILLS Pine Lawn Valley, Western New Mexico—Paul S. Martin, John B. Rinaldo and Ernst Antevs—*Chicago Natural History Museum*, 252 p., illus., paper, \$3.50. A study of some of the problems of the origin and development of Mogollon culture.

DIRECTORY OF MEDICAL SPECIALISTS, Vol. 4—E. L. Jenkinson, Chairman, Directory Committee—*Manus*, 1182 p., \$12.25. Issued under the authority of the Advisory Board for Medical Specialists.

GENETICS, PALAEOLOGY AND EVOLUTION—Glenn L. Jepsen, George Gaylord Simpson and Ernst Mayr, Eds.—*Princeton University Press*, 474 p., illus., \$6.00. A presentation of various aspects of organic evolution by the Committee on Common Problems of Genetics, Paleontology, and Systematics of the National Research Council.

THE GEORGE C. DAVIS SITE, CHILROCK COUNTY, TEXAS—H. Perry Newell and Alex D. Krieger—*Society for American Archaeology* jointly with *American Antiquity*, 225 p., illus., paper, \$3.50. A description of the site, excavations and buildings with an analysis and interpretation included.

LABORATORY EXPLORATIONS IN GENERAL ZOOLOGY—Karl A. Stiles—*Macmillan*, 104 ed., 311 p., paper, \$3.25. A complete revision of this manual for the college freshman.

MAN ON THE LANDSCAPE The Fundamentals of Plant Conservation—Vernon Gill Carter—*National Wildlife Federation*, 129 p., illus., \$1.50. For teachers and students of plant science.

MATHEMATICAL TABLES—Harold D. Larsen—*Rinehart*, 160 p., illus., \$1.00. Part one of the regular edition of *Rinehart Mathematical Tables*, containing the numerical tables most frequently needed in mathematics and engineering.

THE NATURAL-NURTURAL CONTROVERSY—Nicholas Pasteur—*King's Crown Press*, 213 p., \$3.25. An attempt to gain some insight into the interrelationships of heredity and environment by giving short biographies of America's contemporary scientists.

NEW KNOWLEDGE THROUGH SCIENTIFIC RESEARCH IN MELLON INSTITUTE—E. R. Weidlein—*Mellon Institute*, 39 p., illus., paper, free upon request to publisher, University of Pittsburgh, Pittsburgh 13, Pa. The 36th annual report describes the current activities.

A NEW SILURIAN TRILOBITE DALMANITES OKLAHOMA—Eugene S. Richardson, Jr.—*Chicago Natural History Museum*, 3 p., illus., paper, 10 cents. Description and remarks.

NOTES ON GROWTH AND REPRODUCTION OF THE SLIMY SALVANDER PLETHODON GUTTINGER—Clifford H. Pope and Sarah H. Pope—*Chicago Natural History Museum*, 11 p., illus., paper, 20 cents. A short study of a collection made in 1948 at Mountain Lake Biological Station, Giles County, Virginia.

106 SUCCESS OPPORTUNITIES An Exploration in the World of Work—*Irco*, 394 p., illus., \$2.50. Material for young people and veterans who need guidance in selecting their careers.

PERSONAL ADJUSTMENT IN OLD AGE—Ruth Shonle Caven, Finest W. Burgess, Robert J. Havighurst, and Herbert Goldhamer—*Science Research Associates*, 204 p., illus., \$2.95. The first report of a ten-year research project at the University of Chicago on the problems of aging.

SCHOOL LUNCH RECIPES USING CANNED FOODS 25-50 Servings—*National Canners Association* (Home Economics Division), 24 p., illus., paper, free upon request to publisher, 1739 H Street, N.W., Washington 6, D.C. Fits into any type of school lunch service.

SCIENCE AND IMAGINATION IN SIR THOMAS BROWNE—Egon Stephen Meiton—*King's Crown Press*, 156 p., illus., paper, \$2.50. A study of Browne's scientific, philosophical, and artistic views.

THE SERIAL UNIVERSE—J. W. Dunne—*Faber* (Distributed in this country by Macmillan), 2nd ed. reprinted, 243 p., illus., \$3.00. A mathematician's view of the physical world as a series of related events reaching to infinity.

TEACHING CONDITIONS AND THE WORK WEEK OF HIGH SCHOOL SCIENCE TEACHERS—*National Science Teachers Association*, 18 p., paper, 25 cents.

Science News Letter, July 9, 1947

GENERAL SCIENCE

UNESCO Seeks Freer Exchange of Publications

➤ FREER exchange of newspapers, books, magazines and most printed matter between nations is the aim of proposed agreement which will be discussed in September at the general conference of the United Nations Educational, Scientific and Cultural Organization in Paris.

A draft of the UNESCO agreement to facilitate international circulation of publications has been circulated to member states.

The draft calls for granting publications freedom from customs duties and import licensing systems and extension of foreign exchange facilities for purchase of publications. Safeguards for domestic publishing industries are provided.

A similar agreement for audio-visual materials will become effective when 10 member states ratify its provisions.

Science News Letter, July 9, 1949

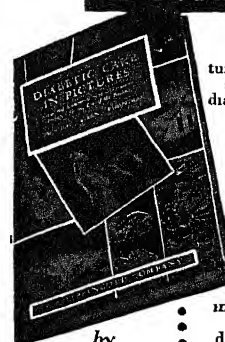
On This Week's Cover

➤ THE first inkling that heavy nuclei exist in cosmic rays came from cloud chamber photographs taken from a balloon sent up 18 to 20 miles above the earth. The balloon apparatus which is pressurized and air-conditioned so that the cloud chamber will work at extreme altitudes was developed by Dr. Edward Ney and Mrs. Phyllis Fieier of the University of Minnesota, who were in one of the groups reporting this discovery to the University of Denver International Cosmic Ray Symposium. Dr. Frank Oppenheimer headed the Minnesota group which in conjunction with scientists at the University of Rochester demonstrated the existence of the heavy particles. (See SNL, July 2, p. 3). On the cover a heavy nucleus (probably carbon) is shown as it enters the chamber from the upper right, penetrates one-fourth of an inch lead plate and breaks up in the next lead plate. In the interaction 12 particles arise.

Science News Letter, July 9, 1949

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✿ **WINDOW VENTILATOR**, that fits snugly under the sash of a partly open window, contains within it an air filter of glass fiber or a processed fiber that will remove the entering air dust particles, pollen and dirt, it is claimed. It is available in natural aluminum or tan-baked enamel finishes.

Science News Letter, July 9, 1949

✿ **SCISSORS SHARPENER** for the home or office is a small block to rest on the table which has a bevel cut in its upper face into which an abrasive surface is fitted. A handle makes it easy to hold the block in position while the scissors blade, guided by the bevel, is pushed over the abrasive.

Science News Letter, July 9, 1949

✿ **CARPET SWEEPER**, operated on the ordinary house current, has a whiskbroom-like action, cleaning at the rate of 3,500 sweeps to the minute. It is light in weight and easily maneuvered on its gliding, wheel-less base, and is claimed to be able to pick up lint and small particles that defy the vacuum cleaner.

Science News Letter, July 9, 1949

✿ **BATHTUB SEAT** for the baby, shown in the picture, makes the job of washing the wiggler easier. The device is made of a durable plastic, uninjured by soap and



water, and has four rubber suction cups to secure it to the bottom of the tub, while two strips of webbing hold baby in place.

Science News Letter, July 9, 1949

✿ **RUBBER MATS**, for the kitchen, bathroom or hallway, have brilliant, full-colored illustrations inlaid in the rubber itself as integral parts of the mat, where they remain permanently. Including the picture is due

to a new development that makes it possible to inlay pure rubber with designs.

Science News Letter, July 9, 1949

✿ **PLASTIC CUP-SHAPED** container for food in the home has an overlapping flexible plastic cover that is easily "peeled" off by hand but can be used over and over again. The cover continues to make a tight seal, which prevents the leakage of liquids, and cover and container are both transparent, permitting easy examination of contents.

Science News Letter, July 9, 1949

✿ **CARPET**, in which weaving is eliminated by cementing the tufts to a heavy cloth backing, is ravel-proof and fray-proof, and can be cut in any direction for fitting or repairing. The adhesive, a development of a rubber company, is tough but flexible, holds the wool tufts, or pile, securely even under rough usage.

Science News Letter, July 9, 1949

✿ **HIGH-SPEED PAPER** counter which can count as many as 1,000 sheets in a pile in a few seconds, is an electronic hand-tool whose stylus is slid quickly over the edges of the paper after the package has been stacked to provide a step-like end. As each sheet is touched separately by the stylus, an electric impulse makes a recording.

Science News Letter, July 9, 1949

Do You Know?

One of every 25 new permanent single-family dwellings started in America in 1948 in non-farm areas was a factory-built or prefabricated house.

The origin of the *speedometer* used on automobiles is attributed to Benjamin Franklin who, while Colonial Postmaster General, invented and used a device on his carriage to measure distances between post-offices.

Fuel that will burn in the airplane engine, but will not catch fire in combat or in a crash, is needed because fire is the greatest hazard of flying.

Germans developed a satisfactory *edible fat* from coal during the recent war.

Hay on many farms is now being cut in bad as well as good weather and dried in the haymow by means of a powered blower that forces air through tunnels under the crop and out through many openings into the hay itself.

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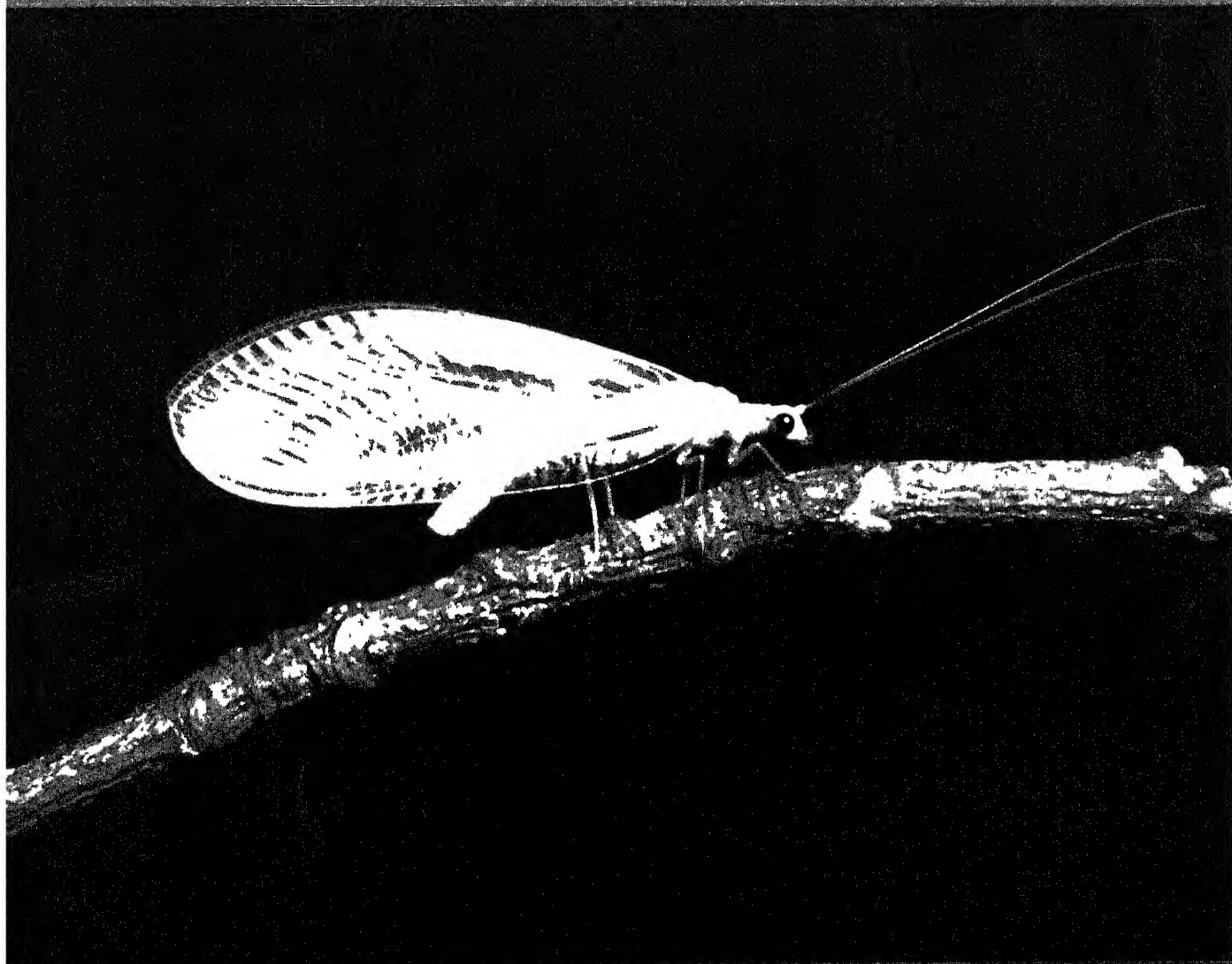
JULY 16, 1949

SCIENCE NEWS LETTER



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THE WEEKLY SUMMARY OF CURRENT SCIENCE



Mrs. Lace-Wing

See Page 43

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VOL. 56 PAGES 33-46

MEDICINE

Blood's Color Death Sign

Pearly white opalescence of the blood serum or plasma following exposure to X-rays signalled death to rabbits. May be applicable to human A-bomb victims.

➤ WHEN the blood plasma or serum takes on a marked pearly white opalescence within 24 hours after exposure to X-rays or possibly atomic bomb rays, it is a sure sign of death.

This was true in the case of rabbits when X-ray doses were given over their whole bodies. Whether it is also true for humans and for radiation from atomic bombs has not yet been determined but seems likely.

Discovery of the opalescence as a sure sign of early death was made by Dr. Robert L. Rosenthal of the Radiation Laboratory and division of medical physics at the University of California. Part of the studies were aided by the Atomic Energy Commission and the Navy.

Dr. Rosenthal made his discovery in the course of studies of the blood clotting reaction after X-rays. All the animals showing marked opalescence of their blood serum or plasma died as a result of the X-ray

dosages within five days. Those with no opalescence or a lesser degree of it usually survived for at least 30 days, unless death came from other causes. If opalescence occurred, it appeared within 24 hours after irradiation and disappeared in all cases within three days.

Possible application of this death sign might be the rather grim one of weeding out among any future atom bomb victims those who were doomed to certain death from those who might be saved by immediate treatment.

Dr. Rosenthal is now trying, with the collaboration of Dr. John Gofman, to determine the chemical nature of the opalescence. Further study of it, he suggests in his report to the journal, *SCIENCE* (July 8) may lead to understanding of the nature of radiation sickness and how radiation kills.

Science News Letter, July 16, 1949

MEDICINE

Heat Danger Signal

➤ DURING heat waves, watch out for sudden stopping of sweating. This is the most important warning sign of impending heat stroke. It is likely to come on about the third or fourth day of a heat wave.

Keeping a look-out for this sign, by regular "sweat rounds," is one of the preventive measures which brought aged residents of the Home of Old Israel in New York through the heat wave of last August without a single death, although the weekly death rate for the city as a whole was more than 100% higher than the expected death rate for that week in August.

The "sweat rounds" and the rest of the stroke preventive program are described by Dr. Louis Friedfeld, chief of medicine at the Home, in a report to the *NEW ENGLAND JOURNAL OF MEDICINE* (June 30).

The program might be equally well followed for sick persons, the very young, and even to some extent by people in general. It calls for light, airy clothing, frequent bathing and proper skin hygiene. Physical exertion and prolonged outdoor exposure during midday are discouraged. Rest periods in well ventilated rooms are arranged. The diet is light, with increased sugar and starch and decreased protein. Salted foods are added to the diet and salt tablets are distributed to the residents of the Home at regular intervals. Plenty of drinking water and citrus fruit juices

are made available and supplementary vitamin preparations are furnished.

"Sweat rounds" are made by the staff of resident doctors to search out the characteristic warning sign of heat stroke. This, Dr. Friedfeld states, has been helpful in starting treatment of heat stroke early.

Treatment starts when a dry skin is noted during a heat wave, even if the body temperature is normal. (Very high temperature is a feature of heat stroke, sometimes going as high as 106 degrees Fahrenheit. Normal is 98.6 Fahrenheit for most persons.)

The patient with dry skin is put to bed and his clothing removed. Since there are no air-conditioned rooms at the institution, sponge baths are given frequently and fans are used to keep the air circulating. The patient is encouraged to drink more water and take more salt. When necessary, salt solution is injected into his veins.

If he does not start sweating soon, or if he has a fever, he is put in an oxygen tent with air cooled to below 50 degrees Fahrenheit. The air is kept moving and the humidity low. Usually this treatment is enough, but if very high fever develops, the patient may be wrapped in cold wet sheets or sprayed from a water nozzle and fans are directed on his body.

Besides the stopping of sweating, patients getting heat stroke may have headache,

weakness, nausea or faintness. Or they may suddenly collapse in unconsciousness. Convulsions, vomiting, delirium or stupor and blue skin are other symptoms.

Heat stroke is the most serious of the three conditions that result from extreme summer heat, Dr. Friedfeld points out. The other two are heat cramps and heat exhaustion. In "sunstroke," either heat exhaustion or heat stroke may appear.

Heat cramps do not end fatally. Heat exhaustion comes when the circulation in small blood vessels fails. Normal persons do not usually die directly from heat exhaustion, especially if removed from the excessive environmental heat. But old persons, those sick with weakening diseases, and those with impaired circulation may have their deaths hastened by heat exhaustion.

Heat stroke results from failure of the sweating mechanism through involvement of a part of the brain called the hypothalamus. Heat stroke alone may be responsible for deaths caused by excessive heat in previously normal persons.

Science News Letter, July 16, 1949

MEDICINE

Beryllium Damage to Skin And Lungs Is Similar

➤ BERYLLIUM causes the same kind of damage to the skin when it gets into it as it does to the lungs when it is inhaled. The damage in both cases consists of a kind of tumor which doctors call granuloma.

Two cases showing this were reported by Drs. A. D. Nichol and Rafael Dominguez of the St. Luke's Hospital in Cleveland in the *JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION* (July 9).

The physicians suggest that this skin condition can be prevented by cutting out the area contaminated by the beryllium before the cuts are allowed to heal.

Both patients had accidentally been cut by broken pieces of fluorescent light bulbs which are coated with zinc beryllium silicate. The cuts healed quickly but subsequently tumors made up of small fleshy masses formed in the scar. There was also ulceration and inflammation at the site of the cut.

Sections of this skin, removed for study, showed that beryllium was present, according to the doctors.

The patients had also developed lung poisoning from working in beryllium-contaminated air to which one had been exposed for four and one-half years and the other for six years. Drs. Nichol and Dominguez noted no change in the lung infection following removal of the beryllium deposits in the skin. Previous reports indicate, they said, that the lungs are not affected by beryllium infection of the skin. The lung damage comes from inhaling the metallic element.

Science News Letter, July 16, 1949

MEDICINE

Cancer from Glasses

Rimless glasses are believed cancer-producing because they conduct heat or chemical rays to the face. Lacquering the lens edge may prevent the danger.

➤ **CANCER** may be caused by wearing rimless spectacles. This discovery, plus a way to avoid the danger, is reported by four physicians of Jefferson Medical College in Philadelphia in the *ARCHIVES OF DERMATOLOGY AND SYPHILOLOGY*.

The danger can be avoided by putting a lacquer, known as *rim black*, on either upper or lower lens edge of the rimless spectacles.

The physicians making these discoveries are Drs. Edward F. Corson, George M. Knoll, Herbert A. Luscombe and Henry B. Decker.

They report 12 cases of skin conditions near the eyes which they believe were caused by heat or chemical rays conducted to the face by the rimless spectacles. In nine of these the condition was diagnosed as cancer and in another case as keratoses, a precancerous condition. The other two were considered cases of chronic actinic dermatitis, meaning a skin disturbance caused by light rays.

Certain types of spectacle frames, and above all the rimless ones with round or oval lenses, were found especially responsible for transmission of light and for focusing it on the skin below the lower

ENTOMOLOGY

Airborne 'Hopper Fight

➤ **THE** grasshopper war in the West this year is almost entirely airborne. This is the first time man has met the enemy in the latter's own element, and there is good reason to hope that the change in tactics will be to man's advantage—if only his ammunition holds out.

The latter point is a matter of some seriousness, stated Dr. W. L. Popham, in charge of field operations for the U. S. Department of Agriculture, who has just returned to base in Washington for conference. In the area of greatest menace,

edge of the lens

The character of the lens, whether thick, thin, sphere, cylinder or prism, was responsible for a certain difference, but the doctors found the same principle existed in all cases in which a wholly or partially unobstructed rim of the lens was present.

The route followed by the light beam could be blocked readily at either edge by use of the lacquer, they reported. When carefully applied this lacquer was hardly noticeable but it did cut off entirely the rays the doctors believe responsible for the damage to the skin.

Science News Letter, July 16, 1949

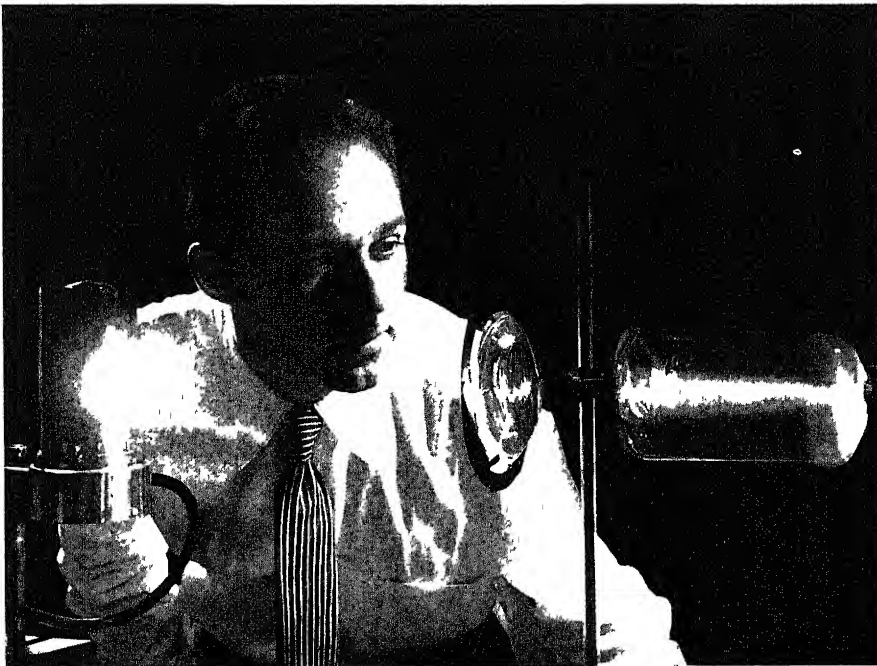
covering some 50,000,000 acres in 16 counties in northeastern Wyoming and southeastern Montana, pre-seasonal campaign plans called for combat over about 1,500,000 acres, with only moderately heavy infestation expected. However, deep snow last winter protected the 'hoppers' eggs, and there has been a heavy hatch and high survival. Upshot is that the infested area is four times as large as anticipated, with more insects per square yard.

Federal and state field forces are now concentrating on the original area because infestation is worst there, and they have speeded up operations to the point where they expect to have all the poison-bran bait now on hand distributed by mid-July.

There are three government-owned planes at work, and 30 additional ones under contract. Biggest plane is a C47, which can lay down the poison barrage over 20,000 acres a day, working with two shifts of pilots. It carries three and one-half tons of poisoned bran per load, and with mechanical loading can fly a maximum number of sorties per day.

Thus far the grasshopper outbreak has been confined wholly to rangeland, with about 20 species of the insects involved. The worst of them, constituting about one-fourth of the enemy forces, is the same species that caused vast trouble in the thirties, for it is an active migrant. Dr. Popham is not too much worried about its getting into crop raising areas this year, since the great wheat areas of the Plains, next in line for attack, are already being harvested. However, surviving hordes that get a chance to lay their eggs next fall could leave a heritage of trouble for 1950. This is one of the reasons why Dr. Popham is hoping that funds for more ammunition may be forthcoming in the next few days.

The Nevada outbreak is a peculiar one, Dr. Popham stated. Only one species is concerned. It has the peculiar habit of laying its eggs in a few extremely concentrated areas, and of migrating in dense hordes from the very beginning of the season. Starting in the southern part of Ne-



IMPRISONED LIGHT—The cone-shaped beam inside the bottle, called resonance radiation, is produced by atoms of sodium vapor that catch the incoming light from the left and toss it out of the bottle scattering it in all directions so that it can be seen. Dr. Daniel Alpert of the Westinghouse Research Laboratories, one of the scientists studying what goes on in fluorescent lamps, electronic tubes, and other gas-discharge devices, demonstrates how light can be imprisoned inside a bottle.

vada, it has moved clear over the state in the past nine years, until it now threatens to cross the border into Oregon and California.

Because it has thus far been confined entirely to semi-arid rangelands, attack on this species has not been considered eco-

nomically justified. Now it may be necessary to get after it with poison, to prevent serious consequences next year. Fortunately, this species has proven quite susceptible to modern poisons, in experimental baitings.

Science News Letter, July 16, 1949

ENGINEERING

Homes at Noiseless Sites

► THE home builder of the future may be able to select his site by referring to a city map showing the location of the principal sources of noise. In order to secure his building permit he may have to show that he has picked a relatively noise-free location or that his designs provide for acoustical treatment that would insure that acoustic comfort is combined with the other comforts of home.

This is the prediction of Dr. Leo L. Beranek, vice-president of the Acoustical Society of America and technical director of the Acoustics Laboratory at the Massachusetts Institute of Technology.

There is no good reason, he says in a report to PHYSICS TODAY (July 1), why our city administrators should not be as concerned with acoustic health as they are with plumbing, lighting and heating problems. We must persuade city officials to prepare city codes and city regulations that govern the location of factories, highways, airstrips and other sources of noise.

At present, he points out, lax building codes have permitted speculative builders to construct apartments and row houses with acoustically transparent walls and resonant floors. If the husband in the family upstairs spills his change when taking off his trousers, the people below feel as though they can count it as it rolls to a stop.

Noise from highways and airplanes has blighted many housing areas which would otherwise be assets to cities. Dr. Beranek reported seeing on the highway between

Worcester and Boston a stretch where house after house is marked for sale—because of noise. One owner said, "Sometimes I awaken during the night with the terrified feeling that a big truck is driving through our bedroom."

Long range planning is needed, Dr. Beranek feels, in the fields of building design, city planning, noise evaluation and noise reduction, and as a basis for such planning, research is necessary.

He urges a central building research station, perhaps financed by the combined building industries, for an initial ten-year period. Out of this station would come ideas for the future that would combine the five essentials of building: Structure, design, lighting, heating and acoustics. England already has such a building research station, and the English have constructed over 100,000 housing units in accordance with a building code requiring types of floor and wall structure developed at this station. This calls for a two-inch floating concrete floor on a half-inch soft glass-fiber blanket over a four-and-a-half-inch concrete slab. Party walls are of two-and-a-half-inch cinder blocks plastered and separated by two-inch air space. Such construction cuts down on noise so that fewer than one tenant out of four complained of being disturbed.

In Holland, there is an experimental apartment house about a block long with 48 apartments. In this building, tests are being made of 38 floor constructions, 32

partition wall constructions and 45 outer wall constructions.

Science News Letter, July 16, 1949

RADIO

Saturday, July 23, 3:15 p.m., FDST
"Adventures in Science" with Watson Davis, director of Science Service, over Columbia Broadcasting System.

Dr. Pierre Auger, French physicist and head of the Natural Sciences Department of UNESCO, and other scientists will discuss "Report from UNESCO."

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PHYSIOLOGY

Cancer Causes Double

Plant studies that seem to be applicable to humans indicate that a substance harmless in itself can cause cancer when another substance is added to it.

➤ IT TAKES two to make that kind of biological quarrel commonly called a cancer. This has been definitely proved for plant cancers, and seems highly probable for human and animal cancers, as well. Dr. Philip R. White of the Institute for Cancer Research, Philadelphia, declared before an international symposium on the growth and development of organisms in Strasbourg, France.

Demonstration of a dual causation of cancer did not come from a single set of experiments. Dr. White reviewed a long course of development in the study of tissue cultures and other artificially-stimulated growths, primarily in France and the United States, in which a considerable number of researchers took part, both independently and as teams.

First came the proof that plant tissues, both normal and tumorous, could be grown apart from the plants that produced them, in glass vessels containing suitable nutrient solutions. One of the necessary ingredients of such culture fluids was shown to be the plant growth hormone, indole acetic acid.

Then it was shown that one of the substances produced when crown-gall bacteria caused plant cancers was this same indole acetic acid. One of the steps in this demonstration was the growth of plant cancers when a weakened culture of crown-gall bacteria, in itself no longer able to start a cancer on a stem, received an assist in the form of artificially applied indole acetic acid.

Yet this acid, applied alone, does not produce plant cancer. Something else, as yet unidentified, is evidently produced by the bacteria. It is not the bacterial cell itself, or anything immediately produced by it, for if the bacteria are inoculated into the plant tissues, left there for some hours, and then killed by heat, the cancerous growth develops later on.

With these evidences for the dual nature of cancer production as clues, students of human and animal cancers have been examining the histories of the malignant growths on which they work for possible parallel cases, and they have been finding some indications that cancer causes in their field are at least as complex.

This, Dr. White admitted, makes the search for cancer causes, and hence for cancer cures, very difficult. However, he would not admit that the search is hopeless. Some research workers have developed techniques for culturing cancer tissues from single cells rather than from whole chunks, and this should trim down the problem materially.

Finally, his own present quest for a completely known and controllable nutrient solution for animal tissues, as successful as his solution for plant tissues has already been, has shown some promise of final success. Once it becomes possible to grow single-cell cultures in a definitely known culture medium, a long step towards final understanding—and hence conquest—of cancer will have been taken.

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CHEMISTRY-ENGINEERING

Synthetic Detergents May Be Fouling the Works

➤ SYNTHETIC detergents may be a boon to the housewife, but they are also under suspicion from chemists for fouling up the works—water works and sewage disposal works.

As the only new factor known, the soap-

less soaps are suspected of being to blame for settling tanks not settling. Water and sewage treatment chemists discussed this difficulty at a recent meeting of the American Water Works Association.

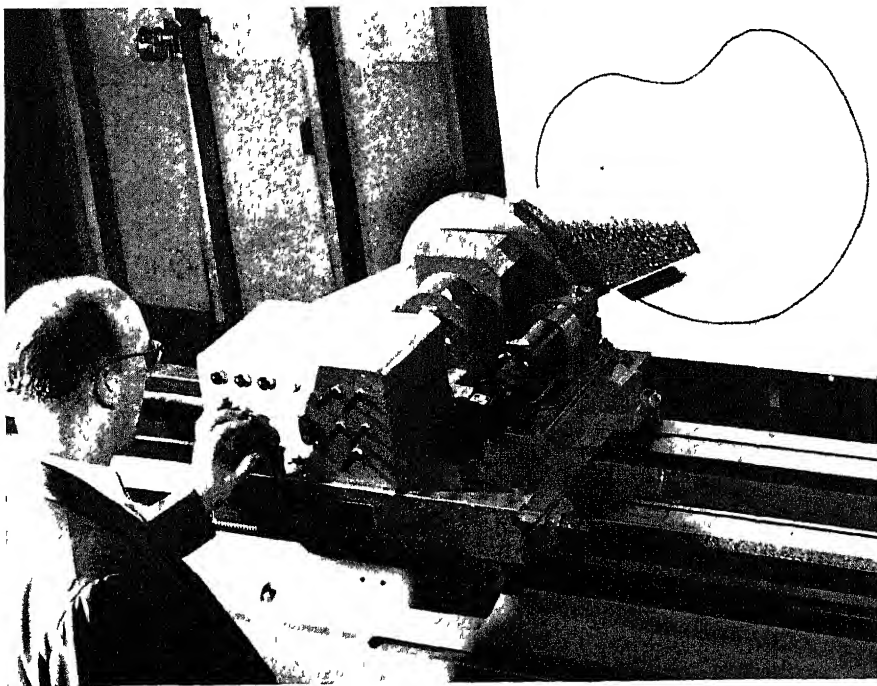
Circumstantial evidence against the synthetic detergents is the fact that the recent settling tank trouble seems to come early in the week. Monday washings with the new products look like a good bet for the blame, the chemists feel.

William Gallagher, superintendent of the Appleton, Wis., Water Department, said that his calculations placed the amount of detergents causing the difficulty at his plant on the order of one part per million. Lindsey Hobbs of the Standard Oil Company (Ind.) indicated that this would make it hard to get proof in blaming the new cleaners. He said that present techniques give only questionable results at concentrations as high as 200 parts per million.

Detergents in the water in very small amounts give an undesirable flavor ranging from soapy to bitter. And they can produce "off-odors", tests described by J. T. Cross of the Chicago Water Department indicated.

Conclusions of the chemists, reported in CHEMICAL AND ENGINEERING NEWS (June 13), were that methods of analyzing for smaller quantities should be developed and ways of decomposing the compounds needed to be found.

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ELECTRONIC CUTOUT—Called the "G-E contour following system," this instrument has an electric eye which follows the lines of a drawing through a microscope. It is connected to a metal-cutting tool which reproduces the drawing's outlines in metal. Developed by General Electric engineers, the device is designed to simplify manufacture of irregularly-shaped metal parts.

MEDICINE-ENTOMOLOGY

Check Sleeping Sickness

► SCIENTISTS at last may have the range in their fight against encephalitis, popularly known as sleeping sickness

For several years a group of University of California scientists have made Kern county, a dry, hot valley area in the southern part of California, a virtual laboratory for the intensive study of this disease which is so much like infantile paralysis

They now report that the disease has virtually vanished from the area, at least for the time being. There is a possibility that the disease is just playing 'possum, as epidemic ailments are wont to do

But there has certainly been a dramatic drop in the cases of encephalitis diagnoses in Kern county since a vigorous mosquito control program was started three years ago by local authorities as a result of the scientists' findings

Only one human case of encephalitis was diagnosed last season. There were eight cases in 1947, and 15 in 1946. Before that there were many more, some reliable estimates indicating that as many as 1,000 cases occurred in the California valleys in one season

There has also been an enormous drop in the incidence of encephalitis in chickens,

a reservoir of the disease, since the advent of mosquito control. Before mosquito control, the scientists regularly found that 25% to 30% of the chickens of the area were infected. But now encephalitis is found in only about 2% of chickens

These developments lend weight to the concept of the encephalitis cycle worked out by Dr. W. McD. Hammon, epidemiologist of the Hooper Foundation. Dr. Hammon found strong evidence that the mosquito was the culprit in the transmission of the virus from fowl to horses and man

Several years must elapse before it is certain that mosquito control measures are responsible for the virtual disappearance of the disease, Dr. Hammon said

In the meantime a team of scientists is on the scene in Kern county, studying the habits of birds and mosquitoes, collecting blood samples for analysis in the San Francisco laboratory. Cooperating in the continuing study are the Kern County Health Department, the National Foundation for Infantile Paralysis, the U. S. Public Health Service, the U. S. Army Virus and Rickettsial Disease Commission, and the State Department of Public Health

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molds or fungi, he said

"Taking the soil sample is often a matter of a knife and a cellophane envelope, or better, of a trowel and a pocket ointment tin, or an icecream cup. On the other hand, a thorough survey requires careful planning and systematic sampling

"Exact laboratory procedures must then be so adapted that representative molds are isolated from every sample. Surprising things may turn up on the isolation plates, and not infrequently a good antibiotic-producing mold may be spotted by the way that it affects the growth of neighboring bacterial and mold colonies, while not being itself pushed around. Each isolate that is selected from the isolation plate is cultured separately in a test tube, each is a pure culture, each is a potential—starter—for comparative work to follow later"

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MEDICINE

Heat Dangerous After Nerve-Cutting Operation

► PATIENTS who have had a nerve-cutting operation for relief of high blood pressure should be especially careful to keep cool with fans, cooling baths and any other possible means during heat waves

This warning, which applies particularly to patients who have recently had the operation, is apparent from a report to the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (July 9)

The report is by Drs. Jameson L. Chassin and J. William Hinton of New York University-Bellevue Medical Center. It concerns two patients who had had the operation and developed high fever, like that of heat stroke, during last August's heat wave in New York City

Both patients had had extensive nerve-cutting operations which abolished the sweating mechanism. In both cases the operation had been performed only a short time before the heat wave struck. One was still in the hospital recovering from the operation

Cold packs, a cold oxygen tent, electric fans and similar cooling measures helped these two patients recover

The doctors find it surprising that this heat reaction does not occur often in patients who have had the extensive nerve-cutting operation, termed thoracolumbar sympathectomy. Although Dr. Hinton has performed it on over 500 patients, only one other case of such a reaction has come to their attention

They believe that once a "readjustment period" of three months or longer has passed after the operation, the sweating mechanism returns in some areas via nerve pathways that have not been completely affected by the operation. This may account for the rarity of heat reactions in operated patients, but also points to the need for care during the first months after the operation

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MEDICINE

Virus Disease Conquests

► SUCCESSFUL conquest of more of the deadly virus diseases by mold drugs such as aureomycin was predicted by Dr. Benjamin M. Duggar, microbiologist of the Lederle Laboratories, Pearl River, N. Y.

Dr. Duggar, the discoverer of aureomycin, made his prediction when he spoke as guest of Watson Davis, director of Science Service, on Adventures in Science, heard over the Columbia network

Aureomycin itself, the golden-yellow drug from an earth mold, recently surprised its discoverer and other scientists by proving successful in routing the much larger than virus size germs of amebic dysentery from the bodies of victims of this rather widespread disease (See SNL, June 25, p. 403)

Previously it had shown itself effective against such small germs as the viruses of primary atypical, or virus, pneumonia, lymphogranuloma, psittacosis, or parrot fever, and herpes zoster or shingles. It has given dramatic results in Rocky Mountain spotted fever and Q fever and has proved effective in experimental typhus fever

Whooping cough, undulant fever, or brucellosis, tularemia, certain blood infections and venereal diseases, a form of mastitis in cattle which is a source of severe throat infections in man, and a heart in-

fection which often ends fatally are other diseases in which this mold drug has been used with success

Although aureomycin is a new drug, first used on humans only a year ago, Dr. Duggar said it is "no doubt old in nature's storehouse of surprises"

Early drugs used against disease, such as quinine and the Indian arrow poison, curare, are the products of green seed-bearing plants, Dr. Duggar pointed out

"With the newer antibiotic drugs, the lowly fungi are assuming dominance as objects of research in the field of natural drugs useful against infections," he said. "It is not that the molds are becoming more magnanimous. It is merely that we are becoming better acquainted with their potential magnanimity"

"A living world without molds would be vast in confusion, vast in rubbish, since fungi are the best scavengers of the tremendous annual tonnage of waste organic matter of field, forest, garden, and even the soil. The fungi must then be numbered among the converters of the dead and the discarded, restoring nature, by preparing for renewed production. Incidentally, among the many by-products of their growth activities are the antibiotics"

Describing the search for new drugs from



FASTER READING—First step is a film record made of the eyes with the ophthalmograph in the Pentagon's Reading Improvement Laboratory. Maj.-Gen. Kenneth P. McNaughton's eyes are photographed by the instrument, as it is adjusted by Staff Sergeant Thomas J. Smith. Film record (left) made by the ophthalmograph reveals the number of stops or fixations made by the eyes in reading lines of type.

PSYCHOLOGY

Improve Reading Speed

Air Force officers are being trained in a special laboratory course to read 50% to 60% faster. This is done by increasing the span of what the eye takes in.

➤THE same technique used during the war to teach aviation personnel to spot and recognize aircraft at the flut of a glance is now being used to train Air Force officers to speed up their reading.

The officers, including generals, are taking turns going to classes in a Reading Improvement Laboratory under the direction of Major B. E. Prater.

After six weeks spent in the Laboratory, the officers find that they can read on the average from 50% to 60% faster than when they entered. They can then go through their mountains of "paper work" much faster.

First step, when an officer goes to the Laboratory, is to photograph his eyes while reading. This is done with a scientific instrument called the ophthalmograph. The film record made by this instrument shows the number of stops made by the eyes in reading a line of type, and the number of times the eyes backtrack to re-read a diffi-

cult word or phrase. It shows up irregularities in rhythm of eye movements.

Basic to the new technique of reading training is a scheme for increasing the span of what the eye takes in at a single glance and the shortening of the time required for that glance. For this the tachistoscope is used. This machine flashes slides onto a projection screen.

At first, the machine is set so that each slide is seen for 1/25 of a second, the length of the shutter click when you are taking a snapshot with your box camera. Later the time is cut to 1/100 of a second. At the beginning of practice the slides contain numbers of five digits. The reader is soon able to recognize any of these numbers in 1/25 or even 1/100 second.

But the idea is to train the eye to cover a greater span in the same brief instant. So he next tries six-digit numbers and gradually works up to seven- eight- and even possibly nine-digit numbers.

This technique was worked out by Dr. Samuel Renshaw at Ohio State University to train men in flash aircraft recognition.

While the reader is lengthening his eye span he is at the same time breaking up any faulty reading habits of pronouncing, either aloud or silently the individual digits—it just can't be done at that speed. You have to learn to recognize by sight alone.

This is what the fast reader must do with the printed page. He must take in a phrase as a whole and not pay attention to individual letters or syllables.

Officers in the Reading Improvement Laboratory spend 30 minutes a day with the tachistoscope. Work is individual, each one has his own tachistoscope and works at his own speed, improving at his own rate. For the next 30 minutes, they move to another room to practice with the reading rate controller. This is a machine developed by Dr. Guy T. Buswell at the University of Chicago. It is equipped with a metal screen that slides down the page of a book at a regular rate, covering up what the individual has already read.

Next step is to carry over the habits learned on machines to the day-by-day reading for work or pleasure. Thus the officer does by reading one page on the reading rate controller and then turning off the machine and reading the next page in the normal way.

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CYTOLOGY

Electron Microscope Aids Study of Genes

➤GENES, the ultra-minute biochemical units that determine the course of heredity in man and other organisms, are moved one step closer to positive identification and detailed mapping by a new method of preparing chromosome-containing cell nuclei for electron microscope photography developed by a three-man research team.

Involving several steps of chemical preparation, the careful squeezing of the nuclei to spread the chromosomes, and preliminary examination under high-powered ordinary microscopic lenses, the new technique has been employed on immature human male sex cells, as well as on material from fruit-flies. An illustrated report of results is presented in *SCIENCE* (July 1).

A feature brought out by the electron microscope, never detected with even the highest powers of the ordinary microscope, is an ultra-fine web of connecting threads between the chromomeres or segments of individual chromosomes. Their significance has not yet been interpreted.

Participating in the research were Dr. Jack Schultz of the Institute for Cancer Research in Philadelphia, Dr. Robert C. MacDuffee of the Army Medical Center, Washington, D. C., and Dr. Thomas F. Anderson of the University of Pennsylvania.

Science News Letter, July 16, 1949

BOTANY

Fungi Present Evidence Of Aid to Plant Roots

► PROOF that fungi on plant roots help the plants in absorbing mineral nutrients from the soil has been written by the fungi themselves on photosensitive plates, in experiments carried out by Drs Paul J Kramer and Karl M Wilbur at Duke University in Durham, N C

Many species of trees and shrubs, and some herbaceous plants as well, have the smaller branches of their roots densely covered with a fine web of fungous hairs, known to botanists as mycorrhiza. It has long been assumed that mycorrhiza aid roots in absorbing water and minerals from the soil, but conclusive proof has been lacking.

Drs Kramer and Wilbur prepared a solution of radioactive phosphate, and immersed in it the roots of pine seedlings, both with and without mycorrhiza. Then they laid the roots on photographic plates, separated from the plates only by a thin layer of aluminum foil. The radioactivity of the phosphorus recorded itself as bright outlines on the sensitive emulsion. Roots with mycorrhiza registered themselves much more strongly than roots without the fungous webs.

An illustrated report of the results of these experiments is presented in the journal, *SCIENCE* (July 1).

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MEDICINE

Allergic to Cottonseed but Not to Cottonseed Oil

► APPARENTLY you can be allergic to cottonseed without being allergic to cottonseed oil such as you get in some salad dressings.

Two cases of this kind of allergy, which is somewhat contradictory to textbook statements on the subject, are reported by allergy researchers of the Department of Agriculture and a Washington, D C, physician in the *JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION* (July 9).

The scientists are Drs E J Coulson, Henry Stevens and H S Bernton.

One of the patients was a physician who himself is a recognized specialist in allergies. He had had hay fever since 1930 and since 1932 hives which could be brought on by trial with non-absorbent cotton or by sleeping on a cotton-filled mattress. He was sure that he also was allergic to cottonseed oil, reporting that he got hives and prolonged abdominal distress with acute griping pain and diarrhea if he ate even a little of it in foods, for example in baked goods made with vegetable oil shortening.

The other patient was a 34-year-old man with asthma who showed an allergic reaction to skin tests with cotton and cotton-

seed, but who stated he had no symptoms from eating cottonseed oil.

Special blood tests, called passive transfer tests, showed that the asthma patient's blood had material that would pass on to others' sensitivity to cottonseed, but the blood of the physician did not.

The allergy specialist was then persuaded to try taking some cottonseed oil, along with corn oil and olive oil, to see whether he could tell by his reactions which was the cottonseed oil. The samples of oil were made to look and taste alike. The allergy specialist was not able to tell the oils apart in quantities commonly present in foods, such as bread or salad.

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GEOLOGY

Billion-Year-Old Burrows Found in Michigan Rocks

► BILLION-year-old wormholes, or burrows made by some creature equally low in the evolutionary scale, have been identified in Michigan rocks by Dr Henry Faul, Massachusetts Institute of Technology geologist, who reports his studies in the science magazine, *NATURE* (July 2), published in London. Traces of life of any kind in rocks as old as this are exceedingly rare.

Some of the burrows are as much as two feet long, and all of them curve and wind more or less. Average width is about one-eighth inch. Dr Faul suspects that the worms, or whatever made the burrows, were feeding on decaying vegetable or animal matter left on top of ancient shore sand that subsequently hardened into quartzite.

The specimens were found in a gold mine near Ishpeming, Mich. Age estimates based on helium contained in rocks of the same mine are on the order of 1,200,000,000 years.

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MEDICINE

Red Noses Believed To Be Caused by Guilt Feeling

► A DEFINITE personality type has been established for the disease called "brandy nose" or rosacea in medical language.

Dr I B Sneddon, of Sheffield, told the British Medical Association at its meeting in Harrogate, England, that the condition which produces a red coloration of the nose, forehead, and cheeks is brought on by an acute emotional crisis involving guilt or indignation.

In support of his theory he quoted studies made on patients with rosacea at the Sheffield Royal Infirmary.

"The fact that so many methods of treatment are successful in improving rosacea is further evidence that the condition is psychosomatic in origin," he declared.

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PALEONTOLOGY

Rare Fossil of "Croc"-Like Animal Given Smithsonian

► ONE of the rarest of fossil finds, the skeleton of a phytosaur, crocodile-like animal that lived 150,000,000 years ago, has been received at the Smithsonian Institution in Washington. It was found in Arizona by workers of the U S Geological Survey.

Although shaped like crocodiles and living more or less as they do, the phytosaurs were not closely related to the "crocs." They were closer kin to the dinosaurs, though the cousinship even here was rather remote. The true crocodiles began to evolve at about the same time as the phytosaurs, and apparently were the fitter to survive. At any rate, they have survived, and there have been no phytosaurs since Upper Triassic geologic time.

Since most phytosaur skeletal remains hitherto turned up have been fragmentary, the newly discovered, almost complete skeleton has especially high scientific value.

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PSYCHIATRY MEDICINE

Mentally Ill Less Likely To Be Hay Fever Victims

► THE MAN who has hay fever may be afraid that it will drive him crazy, but if he really were crazy he probably would not have hay fever. The mentally ill do not generally suffer from this affliction.

At the height of the ragweed season, tests were made on 1,875 patients at the Coatesville, Pa., Mental Hospital of the U S Veterans Administration, and on 757 well employees of the same institution.

Signs of hay fever or other allergy were found in only 29% of the patients with the common mental illness schizophrenia and in only 14% of those suffering from manic-depressive psychosis. By contrast, 13% of the employees had allergies from the ragweed pollen. Among epileptics the incidence was the same as in the comparison group of employees—13%.

Somewhat more of the patients had a history of allergic symptoms in the past than were actually showing signs of allergy at the time of the test. Altogether, 57% had such a history. Of the comparison group, 21% had a history of past symptoms.

Details of the test are reported in the *AMERICAN JOURNAL OF PSYCHIATRY* (May), by Dr Robert M McAllister, of the Coatesville Hospital, and Dr Arthur O Hecker, clinical director of the institution.

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E FIELDS

NUCLEAR PHYSICS

Exploding Atoms Mailable If Radioactivity Is Weak

➤ **EXPLODING** atoms may now be sent by mail

New Post Office regulations allow isotopes, clock dials, uranium ores, luminous compounds, and radium paints to be mailed if their radioactivity is weak enough

The amount of radiation at the surface of the package is limited to one-tenth of the maximum that is considered safe for human body exposure daily. In terms of the measurement of radioactivity, this is 0.010 of a roentgen during one day.

This is less radioactivity than would fog an undeveloped photographic film in 24 hours.

Uncle Sam's mailmen have relaxed their stringent embargo on radioactivity because of an increasing demand from industry to allow the mildest sort of radioactive materials to be carried in the mails. Heretofore, except for very small quantities of luminous paint and polonium, a radioactive element, radioactive materials have had to be sent by express.

The radioactive materials sent by mail may be in the form of liquids, solids or gases, but they must be properly packaged and labeled. The gamma radiation must be less than 10 milliroentgens for 24 hours at the surface of the parcel, and there must be no significant alpha, beta or neutron radiation.

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ENGINEERING

Device Records Time on Teletypewriter Messages

➤ **A STATION** identification and time line is added automatically to almost every telegraphic message sent out by the Army Communication Center in the giant Pentagon building in Washington, by means of a complicated electronic device invented in the center's shop by Syrl K. Ferguson, the Office of the Signal Corps has revealed.

This automatic device saves the necessity of making a manual notation on a message of the time it was sent, and it guards against the possibility of errors in the record. The heart of this electric timer is an electric clock. The time line, which includes station identification, is added to the end of the message, and it gives a record of the exact time the message is received at its destination or at the first relay station en route. It operates only for outgoing messages. Incoming communications must still be recorded manually.

This timing mechanism is designed to serve a maximum of 100 teletypewriter circuits that are operated by hole-punched paper tapes. It also stops and starts transmitting machines when appropriate and, after adding the station identification and dispatch time to the message, causes the tape to move enough to permit tearing it between messages. By adding more circuits, the message timer can be enlarged readily to serve many more machines than the present 100.

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GENERAL SCIENCE

Atomic Scientist Attacks Non-Communist Affidavit

➤ **REQUIREMENT** of a non-Communist affidavit from scientists receiving Atomic Energy Commission fellowships was bitterly attacked by an atomic scientist.

Dr. Leo Szilard of the University of Chicago criticized science leaders for accepting the affidavit. Writing in the *BULLETIN OF THE ATOMIC SCIENTISTS* (June-July), Dr. Szilard called the AEC fellowship oath "the lesser evil."

Science leaders agreed to the oath to ward off a requirement that all fellowship candidates be investigated by the FBI, the physicist contended. Dr. Szilard said they felt the oath was a lesser evil, but he believes they were wrong.

If it's "reasonable," as some science leaders stated, to ask for the oath, Dr. Szilard argues that it is also reasonable to refuse to take an applicant's word that he is not a Communist. The result, he points out, would be an investigation of all applicants for fellowships. In the end, suggests the University of Chicago scientist, it might be felt "reasonable" to investigate all faculty members and students of universities receiving federal aid.

Scientists criticized by Dr. Szilard for acceptance of the affidavit requirement include Dr. A. N. Richards, University of Pennsylvania scientist and president of the National Academy of Sciences, Dr. Detlev W. Bronk, president of Johns Hopkins University and chairman of the National Research Council which administers the AEC fellowships, and members of the executive committee of The American Institute of Physics. Members of the committee are Prof. G. R. Harrison of the Massachusetts Institute of Technology, Dr. Paul E. Klopsteg, president of Central Scientific Company, Chicago, Prof. F. W. Loomis of the University of Illinois, Prof. George B. Pegram of Columbia University, and Wallace Waterfall of the Acoustical Society of America.

The Institute committee approved the oath requirement in a statement sent to the Congressional Joint Committee on Atomic Energy, while Drs. Richards and Bronk testified before the committee on the subject.

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GENERAL SCIENCE

Choice Wood for Army Skis Bought Back from Europe

➤ **CHOICE** hickory wood needed for American Army skis has been sent to Europe and bought back at premium prices by U. S. ski makers, an Army officer told a scientific meeting on wood in Washington.

Lt. Col. R. H. Wilhelm, a wood expert from the Department of Army's Quartermaster Corps, described the exacting requirements for wood for Army skis at a symposium sponsored by the National Research Council and Office of Naval Research.

Col. Wilhelm declared, "Several manufacturers have stated that large quantities of choice hickories are being shipped to several European nations and in various instances it has been necessary for manufacturers in the United States to buy our hickories back from these same European nations."

"The result is that they must pay an enormous premium for this wood," he charged.

This situation "may have been taken care of" in the past few months, Col. Wilhelm added.

If you've had any trouble getting plywood in the last few months, the Quartermaster Corps may be to blame, the spokesman indicated.

Col. Wilhelm said that the Corps has procured half a million locker trunks—25 square feet of plywood in each one—during the past six months.

The Army officer said he understood that this had "caused a considerable drain on the plywood manufacturers due to the accelerated delivery schedule we had in the contract."

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ASTRONOMY

Camera Replaces Eyes for Reading Astronomy Scales

➤ **ASTRONOMERS** no longer rely on their eyes to read off the scale markings on their most precise instruments.

E. G. Woolsey of the Dominion Observatory, Ottawa, Canada, told the American Astronomical Society meeting that cameras are being used to photograph the division marks on the declination scale of the Observatory's meridian circle telescope.

Declination measure of star positions, made with this telescope, can be used to determine latitude exactly. Latitude changes because the axis on which the earth rotates keeps moving around a bit inside the earth. Greatest change from a mean position is about 40 feet.

A similar use of camera apparatus is for similar studies at the U. S. Naval Observatory in Washington.

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CHEMISTRY

Strange, Versatile Plastic

Polyethylene-made plates, cups and ice box dishes are tasteless, odorless and unbreakable. The plastic is also used for pipes in industry and tubes for surgery.

By MARTHA G. MORROW

► POLYETHYLENE, one of the newest of the plastics, is also one of the strangest

Dishes of this gas-derived resin float on the sudsy water in which they are to be washed

Few chemicals affect it, and even those in which it will dissolve must be heated before they act as a solvent

Thin films of the plastic are soft and pliable, thick slabs of it are tough and hoity

Plates, cups and ice box dishes that are tasteless, odorless and unbreakable are made from polyethylene. Films of it provide packaging material for both commercial and home use. Bottles, tops, materials for shoes and handbags, and even drain pipes are created from this unique plastic

As early as 1933 it was known that ethylene, used for anesthetics and to hasten the ripening of fruit and vegetables, could be polymerized, that is, linked together in long chains to form a resinous material. After pilot plant trials for several years, commercial quantities were first produced in the United States six years ago. Most of the early production of polyethylene was used to insulate high-frequency wire and cable, so essential to the war effort

Made from Ethylene

This new material is made from ethylene at high temperatures and high pressures. Composed of long chains of hydro-carbon groups consisting of carbon atoms combined with twice as many hydrogen atoms, polyethylene shows great promise as a versatile plastic. Today, for instance

Large pipes of polyethylene carry hot nitric acid in atomic energy plants, while tiny tubes of the plastic have been used to control bleeding stomach ulcers.

Bottles of polyethylene are strong enough to transport liquids great distances and under rough conditions, yet flexible enough for the containers to be used as atomizers upon reaching their destination

During 1948, approximately 15,000,000 pounds of polyethylene were produced in this country. About 6,000,000 pounds were made into film for packaging everything from garden soil to frozen foods. This year Bakelite and duPont expect to more than triple production of this raw material so that an estimated 20,000,000 pounds will be used for film, an equal quantity for coating wire destined for television, radio and electronic applications, and another 8,000,000 or so for molded cups, plates and

so on

Polyethylene is the lightest of the plastics. It weighs less than an equal quantity of water, its specific gravity being .92. Thus pellets of the plastic float on water and even a polyethylene tumbler filled with water does not sink to the bottom

It softens at a temperature a little below that of boiling water, and, therefore, dishes made of it should not be placed in boiling water. They may, however, be rinsed in very hot water (170 to 180 degrees Fahrenheit) without harm

One of the outstanding characteristics of polyethylene is its chemical inertness. Few materials mar the good looks of its satiny surface. It is insoluble in all organic solvents at normal room temperature

Acids Don't Stain

Vinegar, lemon juice and acetone, if left on the plastic, leave no mark or stain when wiped off. The plastic does dissolve in carbon tetrachloride (frequently used as a household cleaning fluid), but this material must be heated to about 140 degrees Fahrenheit to be effective

This chemical inertness of polyethylene makes it more difficult to seal pieces together with a solvent than with heat. Thin films are usually sealed with a hot iron or similar equipment, thick pieces are welded together by using gas-welding equipment or hot air

One of the advantages of polyethylene, on the other hand, is its inherent flexibility, thus no plasticizer need be used. The resin merely is heated, then molded into cups or extruded into thin films

Impermeability to all but a very few liquids and gases, plus the fact that it is odorless and tasteless, is largely responsible for the success of polyethylene film

Its uses range from washers for your sink or washbowl to disposable bottles for baby's milk to liners for drums in which chemicals are shipped

A novelty woven fabric is being made from polyethylene. This material, developed specially for shoes and handbags, is made by slitting thin film into ribbons, folding it, and then weaving it into cloth with a pack weave. One of the advantages of this type of cloth over other plastic cloth is that it has enough body to hold its shape, while still retaining its flexibility

Circular tubing as well as flat films of polyethylene are popular. Such tubing has transparent walls only .001 to .004 inch thick. Miles and miles of this tubing are made by forcing the hot plastic through

a narrow circular opening. The tubes can be heat-sealed where desired, producing long or short bags without seams

Thin films of polyethylene are also being used to protect paper, cloth and metal. A coating only .0015 inch thick, for instance, converts shelf paper into a washable article giving long service

This very thin coating can be applied either to paper or cloth in two ways. It can be put on by knives that place a fine layer on the material as it passes beneath them. Or an extremely thin polyethylene film can be laminated to the paper or cloth with an adhesive

By either of these methods, however, 15 pounds of polyethylene will coat 3,000 square feet with a layer .0015 inch thick. That means the coating is about one-half as thick as the page of the daily newspaper which you read. Thin as this layer is, it provides all the necessary protection to the underlying cloth or paper

In general, polyethylene resins are fabricated in almost exactly the same manner and in many of the same types of machinery as other thermoplastic materials. The principal difference between this and other plastics is that polyethylene softens and becomes quite fluid at a lower temperature. On the other hand, it can be molded at extremely high temperatures

At the higher temperatures, however, shrinkage becomes a problem. Thus, in the molding of polyethylene, dies must be



TOUGH BUT PLIABLE—Thin, transparent polyethylene plastic has outstanding qualities for keeping what's inside in and what's outside out. This makes it useful for packaging foods.



FLEXIBLE CONTAINER—Squeezable bottle made of polyethylene is both a container and an atomizer, being used for nosedrops and deodorants.

designed to allow for the material to shrink as much as 4% as it cools, although other adjustments can reduce this to as little as 2½%. Thick sections also require special cooling techniques to avoid the formation of voids or bubbles in the center.

Films of polyethylene are outstanding for their folding resistance. They may be creased, yet readily spring back into shape when released. Also these films do not become brittle upon long exposure to freezing and below-freezing temperatures. They have a soft, warm and somewhat waxy feel. Thick sections of the plastic bounce when dropped.

Polyethylene is highly transparent in thin layers immediately over an object, but it is translucent when thick. It naturally is colorless, with a "frosty" appearance. Dyes and pigments may be added, however, to produce a wide variety of colors.

Polyethylene, like many other plastics, is produced in a variety of grades, each with different physical properties. In some grades, many more atoms of hydrogen and carbon

—but always the same proportion of two atoms of hydrogen to one of carbon—are linked together to form each molecule of polyethylene than in others. Thus some have a much higher molecular weight than others.

Polyethylene of very low molecular weight is a grease or wax, that of medium molecular weight is a soft wax-like resin, and that of very high molecular weight, the kind used in articles being sold now, is tough and horny. In all cases, however, the molecules are formed of carbon atoms joined together to form long chains.

Would you like to examine some polyethylene products yourself? A bouncing measuring cup (1, 1½ and 2-ounce) with an air- and liquid-tight cover is included in a kit assembled for you by Science Service. Samples of polyethylene resin, tubing, coated papers and cloth, and woven fabric as well as explanatory material will be sent you for only 50 cents. Write Science Service, 1719 N Street, N.W., Washington 6 D.C.

Science News Letter, July 16, 1949

NUTRITION

New Food Process Danger

➤ **WARNING** of a possible danger of a chemical contamination of food from a new food process was issued by the Council on Foods and Nutrition of the American Medical Association.

The process consists in adding chemicals to foods such as bakery products to make them stay *fresh* longer, or to give them a

smoother texture or some other attractive quality. The chemicals, of which there are hundreds, are known as "surface-active" compounds. Some of the most widely used are derived from polyoxyethylene combined with fatty acids and sometimes with a special alcohol known as sorbitol.

The process is viewed with alarm, Dr.

James R. Wilson, secretary of the Council, states in the *JOURNAL OF THE A. M. A.* (July 2), because little is known about the poisonous effect of the surface-active compounds being added to the food or what effect they have in reducing nourishing value.

The food to which the compounds are added are usually smooth-textured, have more sales appeal and contain less fat. In bread and bakery products there may also be lowering of important food ingredients because the compounds have the ability to produce the same properties of "freshness" as the nonfat milk solids.

If, in addition to bakery goods, these agents were added to such foods as ice cream, candy and peanut butter, the public would be consuming a large quantity of the compounds whose possible poisonous qualities are as yet unknown, Dr. Wilson pointed out.

"Unless the complete harmlessness of these agents can be demonstrated beyond reasonable doubt, they should not, in the Council's opinion, be employed in basic foods," he stated.

The second danger, that of reducing the nutritional value of food, stems from the fact that less fat, milk solids and sometimes eggs are required when the compounds are added to the food.

"Thus far, the use of these substances is limited," an editorial in the same issue of the *JOURNAL* declares, "but their possible range of application includes almost all foods containing starch or fat. When a chemical technologic aid may find its way into the daily diet of nearly everyone from infancy to the grave, the necessity for being assured of its safety becomes significantly increased."

The editorial concludes with the warning that it is an invitation to trouble to ignore the need for preliminary study.

The U. S. Food and Drug Administration in Washington is currently holding hearings on the use of these substances in bread. After all the evidence is in, Food and Drug is expected to issue a ruling, technically termed a "definition", as to whether such substances can be added and in what quantities and to what products.

Science News Letter, July 16, 1949

On This Week's Cover

➤ A FAIRY-LIKE creature with strange offspring is the golden-eyed lace-wing fly shown on the cover. Mother lace-wing has transparent lace-like wings of pale green hue and beady golden eyes that glisten in light. But her children, in the earlier stages of a strange life cycle, are another matter. They are the aphid lions which feed on plant lice. These aphid lions are so blood-thirsty when born that each egg is laid on the end of a separate tiny silken stalk so that the aphid lions will not eat each other.

Science News Letter, July 16, 1949

MEDICINE

Warn Against Antiseptics

➤ A WARNING that acute skin inflammation may be caused by organic mercury compounds used as antiseptics is issued by Drs L Edward Gaul and G B Underwood, skin specialists of Evansville, Ind, in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (July 9)

Interestingly, the color, red, really signifies danger," they declare, referring to the red color of these compounds

Merthiolate, mercurochrome, metaphen and mercresin are the compounds they specifically warn against

The "continued popularity" of these compounds among surgeons preparing the skin for operation is attributed by the Evansville physicians to the fact that in most surgical cases the compounds are applied to normal skin. It is when the skin barrier has been broken by infection, burns, tears, scratches and scrapes such as those occurring in automobile accidents that the organic mercury compounds are likely to cause trouble

The skin inflammation may not develop immediately, but in persons who have become sensitized to a particular compound, second use of the same compound is likely to produce skin inflammation very quickly

The inflammation usually appears as little blisters or pimples around the original injury and is often considered an infection. Unless the role of the organic mercury compounds is known, one of them is likely to be used to treat the supposed infection, a measure which is likely to make the trouble worse, or at least keep it going

Five out of 20 patients sensitized by these compounds were so sick they had to be put in a hospital for treatment

Patch tests, something like those given for allergies, were made on 400 patients with skin disease. Positive reactions occurred in 40%, or 160 patients. The reactions were to the remedies they had used. In 56 cases the "offender" was one of the organic mercury compounds

Science News Letter, July 16, 1949

PHYSIOLOGY

You Can Stand High Heat

➤ IF YOU are wondering how much hotter it can get and how much longer you can stand this sweltering summer heat, scientists have an answer for you

If the temperature were 240 degrees Fahrenheit, instead of the 90 to 100 degrees your outdoor thermometer may be registering, you could probably stand it for about 23 minutes

This "average limit of human tolerance," 240 degrees Fahrenheit for approximately 23 minutes, was announced at the meeting of the American Society of Heating and Ventilating Engineers in Minneapolis

The limit figures were discovered in studies with student volunteers. The studies were made by Craig L Taylor, associate professor, and W V Blockley, research

associate, of the department of engineering of the University of California

Their research was spurred by problems of supersonic aircraft, though human tolerance for extremely high temperatures has long been a problem of industrial physiology and hygiene. If the cabin air conditioning system of a very high speed plane failed, heat would become a hazard to pilots and occupants. At low altitudes on a 100-degree summer day an temperature in the cabin at a speed of 800 miles per hour would, if the air conditioning failed, rapidly reach 215 degrees, or three degrees above the boiling point of water

Industrial exposures to high heat also occur. A plastics engineer regularly spends 10 minutes out of each 30 in an oven at 200 degrees Fahrenheit. A kiln technician is exposed many times for two or three minutes at a time to 250 degrees and sometimes to 500 degrees. Mining engineers tell of rescue parties exploring pockets in a burning mine where temperatures ranged up to 240 degrees

Hot air inhaled by the students in the tests was cooled as much as 100 degrees Fahrenheit in a few inches of travel down toward the lungs. This cooling action of the mucous membranes lining the nose, mouth and breathing passages was one of the observations made

Although the heart rate was speeded from the normal of around 75 beats per minute to 160, electrocardiograms taken before and after heat exposure showed no distinct signs of heart damage

The maximum mean skin temperature was 107 degrees Fahrenheit, reached in an exposure to 240 degrees

"An hunger" was commonly felt in all exposures carried to the tolerance level. With this there was deep, irregular breathing, restlessness and nervous irritability. Waves of dizziness developed at the finish of the tests

The studies were made with "intelligent and manful cooperation" by the students in a five-foot, ten-inch heat chamber. Humidity was not controlled but resulted from outdoor temperature and the moisture added by the volunteer. Clothing for the test consisted of a close-fitting wool and cotton one-piece union suit eight-hundredths of an inch thick and loose-fitting felt duffel socks

Science News Letter, July 16, 1949

ENGINEERING

Room Humidity Depends on Proper Sidewall Materials

➤ THERE is a relation between the humidity in a room and the material of which the walls of the room are made, it was pointed out to the American Society of Heating and Ventilating Engineers in Minneapolis by Prof E R Querc of Pennsylvania State College. The fundamental thing that heating engineers must determine to make proper installations is how fast moisture can be transmitted through the sidewall material, and he described a new instrument for measuring this vapor transmission

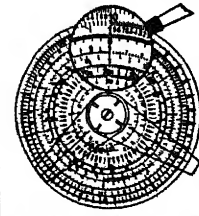
The rate of transmission is known to technical men as the "permeance" of the material. Many devices have been used to measure permeance, he said, but a new method has been developed at the institution he represents which overcomes some of the limitations of former methods and provides a means of testing thicker materials

This new method involves the use of an apparatus in which the material being tested can be sealed between two cups, thus eliminating the need for humidity control of the surrounding atmosphere. Within one cup of the double-cup cell a pan of water is placed. In the other is placed a water absorbing substance, what chemists call a desiccant. Water from the pan gradually passes through the material under test to the desiccant. The loss of weight in the water in the pan is measured, and the gain in weight of the desiccant. Both weighings can be made without removal of the water and desiccant pans from their chambers

Permeance of a material tested with this apparatus, he said, depends upon the weight of the vapor transmitted, the time required for transmission, the area of the specimen and the difference in vapor pressure in the two chambers. F. A. Joy, of Pennsylvania State College, was co-author of the paper presented.

Science News Letter, July 16, 1949

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ENGINEERING

Oxygen in Steel Making

➤ THE increasing use of gaseous oxygen in the British iron and steel industry will be reviewed by D J O Brandt of the British Iron and Steel Research Association at the meeting of the UNSCCUR at Lake Success, N Y this summer, it was revealed

UNSCCUR is short for the international group whose full name is the United Nations Scientific Conference on the Conservation and Utilization of Resources. The use of oxygen instead of air in blast furnaces of various types has made great progress since the closing of the recent war, and is now widely used both in America and Europe. There is still much to be learned relative to its economical application, and the English experience will add to world knowledge.

The open-hearth furnace, the electric furnace and the steelmaking converters have all been shown to benefit considerably under certain conditions, Mr Brandt will state. To a lesser extent the blast furnace for the production of pig iron and ferro alloys has also been considered with regard to improving performance with an enriched blast.

The basic causes of the recent upsurge of interest are probably two-fold, firstly the

desperate world-wide steel shortage stimulating any and every means of increasing the productivity of existing plants, and secondly the prospect that within a comparatively short time "medium purity" oxygen will no longer be an expensive commodity, he will state. Another possible reason is the need to conserve natural resources. Under certain conditions the employment of oxygen may be accompanied by savings both in fuel and certain raw materials.

Oxygen has been applied to the open hearth to accelerate both melting and refining. The electric furnace has also been shown to benefit considerably when oxygen is used as a refining agent. Enrichment of the blast in steelmaking converters has been undertaken at several places, giving increased outputs and improved quality of products.

Enrichment of the air blast in a normal blast furnace has not proved quite so advantageous, according to Mr Brandt. This is largely because the blast furnace is thermally a very efficient machine. But the use of small, low shaft furnaces particularly designed for oxygen work may enable low-grade ores to be smelted which were

hitherto uneconomical, and may also be applied to the smelting of ferro alloys which normally are produced in the electric furnace.

Science News Letter, July 16, 1949

Words in Science— INSECT-BUG

➤ NOT ALL those pests that you chase or that chase you in the garden and at the beach are properly called bugs—or insects either.

The scientist likes to reserve the word "bug" for a certain kind of insect with fore wings shorter than the hind wings and with a piercing, sucking beak. Typical bugs are squashbugs, stinkbugs, and bedbugs.

The word insect is derived from the Latin and means "cut into" which refers to the form of the body. It is divided into a head, a thorax of three segments from each of which grows a pair of legs, and an abdomen of 10 segments. The principal clue to the identification of insects is the number of their legs—six.

A spider, which has eight legs, is not properly called an insect. Neither is a centipede.

Science News Letter, July 16, 1949

The *Lifeblood* of Industrial America

OIL!

TITAN OF THE SOUTHWEST

by Carl Coke Rister

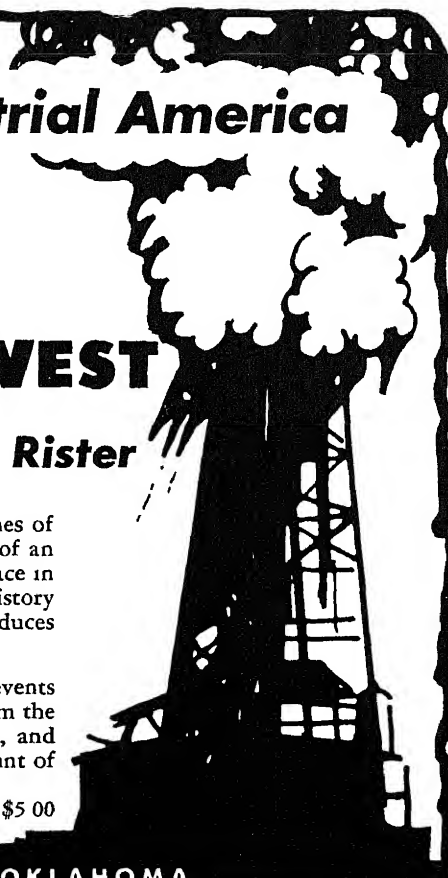
OIL!... that builds cities and destroys men . . . that runs the machines of war and turns the wheels of peace. Here is the whole story of the growth of an empire that started with a rheumatism remedy. It is the only attempt to place in proper perspective the rise and ultimate contribution of an industry to our history and economy. Today oil is a billion dollar business, and the Southwest produces 70 per cent of America's petroleum.

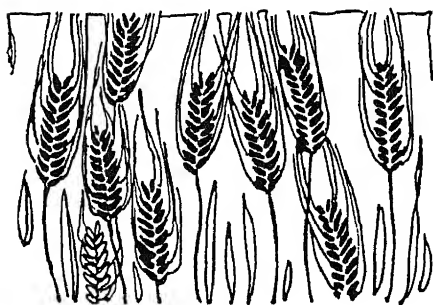
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All Flesh Is Grass

➤ NEBUCHADNEZZAR, the king who literally "went to grass" has become a traditional figure of pity, mingled perhaps with a little contempt. Though in his madness he gnawed the grass at its roots, his fall was not so great as we may fancy—only the height of a grass-haulm. For all of us, wise men and madmen alike, are eaters of grass, only we ordinarily feed at the top instead of the bottom of the stem.

Everyone who eats bread, or rice, or tortillas, or oatmeal porridge, or polenta, or hominy grits, or any other food made from grain, eats grass. All grains are grasses, and all the grain we grind and eat is the seed of grasses.

When you stir cane sugar into your coffee or tea, or eat it in candy or ice cream, you are again a grass-eater, this time at a slight remove. Sugar cane is also a giant grass, and sugar is merely its boiled-down and refined sap.

Finally, when you eat meat or cheese or butter or drink milk, you are getting your grass second hand. All our meat and dairy animals feed on grass, and if bees and hogs are finished for the market on grain,

they are eating grass seed just as we do in our bread or rice.

Except for the grasses which the cattle eat, the species chosen by man for cultivation are the giants of their tribe. Sugar cane, corn and bamboo are the biggest of all grasses, while wheat, rice, rye and the other so-called "small grains" are still much larger than the great majority of grass species.

Of course the grains were selected by early man as his principal food not because of their height but for the size of their seed. There are a good many other tall

grasses, some of them taller than wheat or rye, that were never given the advantages of cultivation, simply because their seeds are too small or too scanty to be worth the labor of harvesting and grinding.

While our cultivated grains are undoubtedly bigger and more prolific than their wild ancestors, even in the wild forms they were worth the trouble of collecting and preparing. It is even suggested by some anthropologists that agriculture originated from the sprouting of seed gathered in the wild and chance-scattered near primitive man's dwellings.

Science News Letter, July 16, 1949

PSYCHOLOGY

Machine Tests Logic

➤ SCIENCE now has a machine that flashes a stop light at an illogical argument.

It can't be used in Congress or in a street corner argument. Dr. Benjamin Burack of Roosevelt College, Chicago, explains in his report to the journal, *Science* (June 17) that the machine has to be set up for particular argument before it will operate.

To operate the machine it is necessary to select blocks to represent the major premise, minor premise and conclusion and put these blocks into three spaces provided on the panel of the machine. A light then automatically flashes on for each fallacy in the argument and a printed card beside the light describes the fallacy in

logical terms.

The whole machine is mounted in the top of a suitcase and the blocks used are in plywood compartments in the bottom part of the case. The entire outfit weighs only 25 pounds.

Limitation of the machine, according to its inventor, is that the argument must first be put into logical form before the appropriate blocks can be fed into the machine.

Earlier machines, Dr. Burack says, have been developed to indicate the conclusions which can be drawn from given premises, but none of them was capable of testing the logic of conclusions already drawn and pointing out and identifying the fallacies.

Science News Letter, July 16, 1949

POPULATION

Asia Over-Populated

➤ WILL the peasant of Asia change his ways of early marriage and frequent babies in time to prevent the population explosion that threatens the East? This is the question raised by a population expert, Dr. Irene Taeuber, of Princeton University, before the meeting of the Population Association of America in Princeton, N. J.

Dr. Taeuber believes that the Asiatic peasant will change his ways and limit his family, but it is a question whether he can change quickly enough to avert the calamity that will otherwise inevitably result from the tremendously increasing population under conditions of modernization and reduced death rates.

The peasant in Asia developed his ideas about having babies in pre-modern times, Dr. Taeuber explained. Then a high death rate, an infant mortality rate probably well above 200 per 1,000 births, periodically severe malnutrition, an occasional epidemic, civil disorders and violence all combined to make permanent survival of the group precarious.

In the face of such hazards, individual groups would have been wiped out if it had not been for high fertility rates.

But behavior developed over thousands of years as one essential to survival, Dr. Taeuber pointed out, now produces such an abundance of children that their numbers menace survival at the more humane levels made possible by order, medical and sanitary technologies and improved agriculture.

But Dr. Taeuber has no doubt that the Asiatic ideas about size of family will change.

"There is accumulating evidence," she said, "that fertility yields under the stimulus and the pressures of modernization, whether the group concerned be the Catholics or the Protestants of the West, the Confucians of China, the Buddhists of Siam, the Shintoists of Japan or the Moslems of Indonesia."

Although some people think that the present traditions with regard to family are accepted unquestioningly by the Asiatic peasant because they always have been and nothing else is envisioned as possible, Dr. Taeuber points to evidence of tensions in the upper groups as revealed by literature and in the peasant masses by the ever-recurrent problem of infanticide.

Science News Letter, July 16, 1949

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THE ALCHIMISTS Founders of Modern Chemistry—F. Sherwood Taylor—*Schuman*, 246 p., illus., \$4.00. A contribution to the history of science and thought. For the well informed layman. Of British origin.

AMERICA'S HEALTH A Report to the Nation—National Health Assembly—*Harper*, 395 p., \$4.50. The official report of the Assembly which met for a four-day session in May 1948.

FEMALE SEX ENDOCRINOLOGY—Charles H. Birnberg—*Lippincott*, 134 p., illus., \$4.00. Designed to serve as a quick reference as needed in the everyday practice of medicine.

FERTILITY AND HATCHABILITY OF CHICKEN AND TURKEY EGGS—Lewis W. Taylor—*Wiley*, 423 p., illus., \$5.00. Reports of research put into terms of practical application.

THE GROWTH OF THE EXPERIMENTAL SCIENCES An Experiment in General Education—James Bryant Conant—*Harvard University Press*, 67 p., paper, free upon request by interested college professor or educational administrator to Mr. Guy Snively, 726 Jackson Place, N. W., Washington, D. C. An experimental method of teaching a general course on science to non science students by the "case method."

HIGHWAY RESEARCH REVIEW A Summary of National Highway Research Activities Reported by the Research Correlation Service—Vol. 1, No. 1—R. W. Crum and Fred Burggraf, Eds.—*Highway Research Board*, 28 p., paper, quarterly, 45 cents a copy. This first number provided a classified listing of highway research projects in progress or recently reported. Future issues will contain articles on current research.

INTERNATIONAL DIGEST OF HEALTH LEGISLATION, Vol. 1, No. 1—*World Health Organization*, 144 p., paper, \$1.25. This journal will consist of reprints and translations of or extracts from the texts of the most important laws and regulations dealing with public health in different countries.

INTRODUCTION TO RADIOCHEMISTRY—Gerhart Friedlander and Joseph W. Kennedy—*Wiley*, 412 p., illus., \$5.00. A text book for students of chemistry on the graduate or senior undergraduate level. The senior author is chemist at the Brookhaven National Laboratory.

M. I. T. LIBRARY ANNUAL 1948—Vernon D. Tate and Margaret P. Hazen, Eds.—*Library, Massachusetts Institute of Technology*, 84 p., paper, 75 cents. Containing articles of particular interest to librarians.

MANUAL OF THE INTERNATIONAL STATISTICAL CLASSIFICATION OF DISEASES, INJURIES, AND CAUSES OF DEATH Vol. I. Sixth Revision of the International Lists of Diseases and Causes of Death Adopted 1948—*World Health Organization*, 376 p., paper, \$6.00. To facilitate the keeping of comparable international statistics.

MODERN SCIENCE AND ITS PHILOSOPHY—Philipp Frank—*Harvard University Press*, 324 p.,

\$4.50. Development of thinking originated in company with a group of other students in Thursday evening bull sessions in a Viennese coffee house. The book includes a critical discussion of Soviet philosophy.

NUTRITION SURVEYS THEIR TECHNIQUES AND VALUE—Committee on Nutrition Surveys—*National Research Council*, 144 p., paper, \$1.50. Intended to contribute to the better understanding of the value and purpose of nutrition surveys and to the development of improved techniques for conducting them.

SEASHORE TREASURES—Charles Howard Edmondson—*Pacific*, 144 p., illus., \$3.50. A timely book for those who wish to pursue their knowledge of nature during a seaside vacation. The seashore creatures are described in non-technical terms and by photographs. Although based on the fauna of Hawaii, it is applicable to many parts of the world.

TIN Its Mining, Production, Technology and Applications—C. L. Mantell—*Remhold*, 2d ed., 573 p., illus., \$10.00. A reference work for those connected with the production or processing of tin. One of the monograph series of the American Chemical Society.

WHITE COLLAR ZOO—Clare Barnes, Jr.—*Double-day*, 74 p., illus., \$1.00. A collection of delightful animal photographs which reminded the author of familiar office personalities from the bearded lion who is pictured as president and chairman of the board to the herd of sheep who represent the morning rush hour.

Science News Letter, July 16, 1949

GENETICS

Identical Twins May Be Frequent Among Antelope

➤ IDENTICAL twins seem to be a frequent occurrence among the pronghorn antelope of the American West. Evidence indicating this was presented by Prof. C. A. Tryon, Jr., of the University of Pittsburgh.

Prof. Tryon made postmortem examinations of a number of pronghorn antelope does that had been killed in Montana. Six of them were found to be pregnant, and all six had twin embryos of the same sex. This is fairly strong indication, though not completely conclusive proof, that they were identical twins.

Science News Letter, July 16, 1949

ASTRONOMY

Newly Discovered Comet Is Growing Brighter

➤ COMET Bappu-Bok-Newkirk, the year's second comet, is growing a little brighter than it was when discovered July 2 at Harvard's Oak Ridge Observatory. Four successive observations by the Harvard dis-

coverers have been made. The comet is about 13th magnitude, which means that a good-sized telescope is necessary to spot it.

The discovering team consisted of a Harvard graduate student from Hyderabad, India, the associate director of Harvard Observatory and a Harvard senior—Vannu Bappu, Bart J. Bok and Gordon Newkirk, Jr. Comets are named after their discoverers, therefore the triple-barrelled name of the new visitor to the vicinity of the sun. Mr. Newkirk was a Science Talent Search winner in 1946 and his home is West Orange, N. J.

Science News Letter, July 16, 1949

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⚙️ **GARDEN HOSE**, one-third lighter than ordinary hose, is made of a high molecular weight vinyl resin which resists oil, grease, sunlight, heat, cold, mildew and rot. This all-plastic hose, with an inside diameter of one-half inch, has full-flow capacity because of the smoothness of its inside surface.

Science News Letter, July 16, 1949

⚙️ **READING GLASS**, shaped like a ruler and with a lens over eight inches long, spans an entire line and magnifies the printing or writing two or three times. It is a self-supporting instrument that leaves the hands free, and can be adjusted to whatever angle or degree of magnification the user prefers.

Science News Letter, July 16, 1949

⚙️ **DOG COLLAR**, and leash, is the round leather collar type but is made of a specially developed pliable Vinylite plastic which has the important characteristic of low temperature flexibility. It is easily cleaned with a damp rag. A novel feature is an identification card built-in pocket.

Science News Letter, July 16, 1949

⚙️ **STITCHLESS COVERS** for household chairs, to re-upholster worn seats, as shown



in the picture, are made of two pieces of special plastic, with a filler between, heat-sealed into a "sandwich." The re-upholstering is easily accomplished by cutting to fit and tacking to the back of the wooden seat.

Science News Letter, July 16, 1949

⚙️ **DOG BATH** mixture, which comes in concentrated form in small capsules ready to mix with water, contains both cleansing detergents and controlled amounts of proper insecticides to kill ticks, fleas and mange mites. The synthetic soaps, containing steam-distilled pine oils, clean the animal's coat and leave no trace of stickiness.

Science News Letter, July 16, 1949

⚙️ **ELECTRICALLY HEATED** rubber strip, similar to those used to de-ice airplane wings and propellers, prevents the accumulation of frost inside frozen-food compartment doors or along the door seals of large deep-freeze units. It contains insulated resistance wires between layers of rubber sheeting.

Science News Letter, July 16, 1949

⚙️ **Dainty PLASTIC** baskets in pastel colors, for individual servings of nuts or candy at a party dinner, have removable handles with plastic place cards attached on which names can be written, to be washed off later. When a larger card is needed, the handle is removed and a small slot on the edge of the basket holds the card.

Science News Letter, July 16, 1949

Do You Know?

In protein value, fish is as nourishing as meat.

The little known metal *indium* is nearly twice as heavy as lead.

About 70% of the oranges grown in America now reach consumers in processed form in cans or bottles.

Coal mining in Turkey started a century ago; the country has an estimated 500,000,000-ton reserve yet untouched.

A new variety of *sweet potato* does not crawl all over the ground like the ordinary kind but grows upright, like a bush one foot high.

About 25,000 tons of *palm oil* is used annually in the American steel industry; it is a lubricant in the cold reduction process of rolling steel sheet to a thinner type.

Scientists have discovered that the *eel* is a source of valuable oil, a poultry food and a fertilizer, as well as one of the richest vitamin packed foods in the world.

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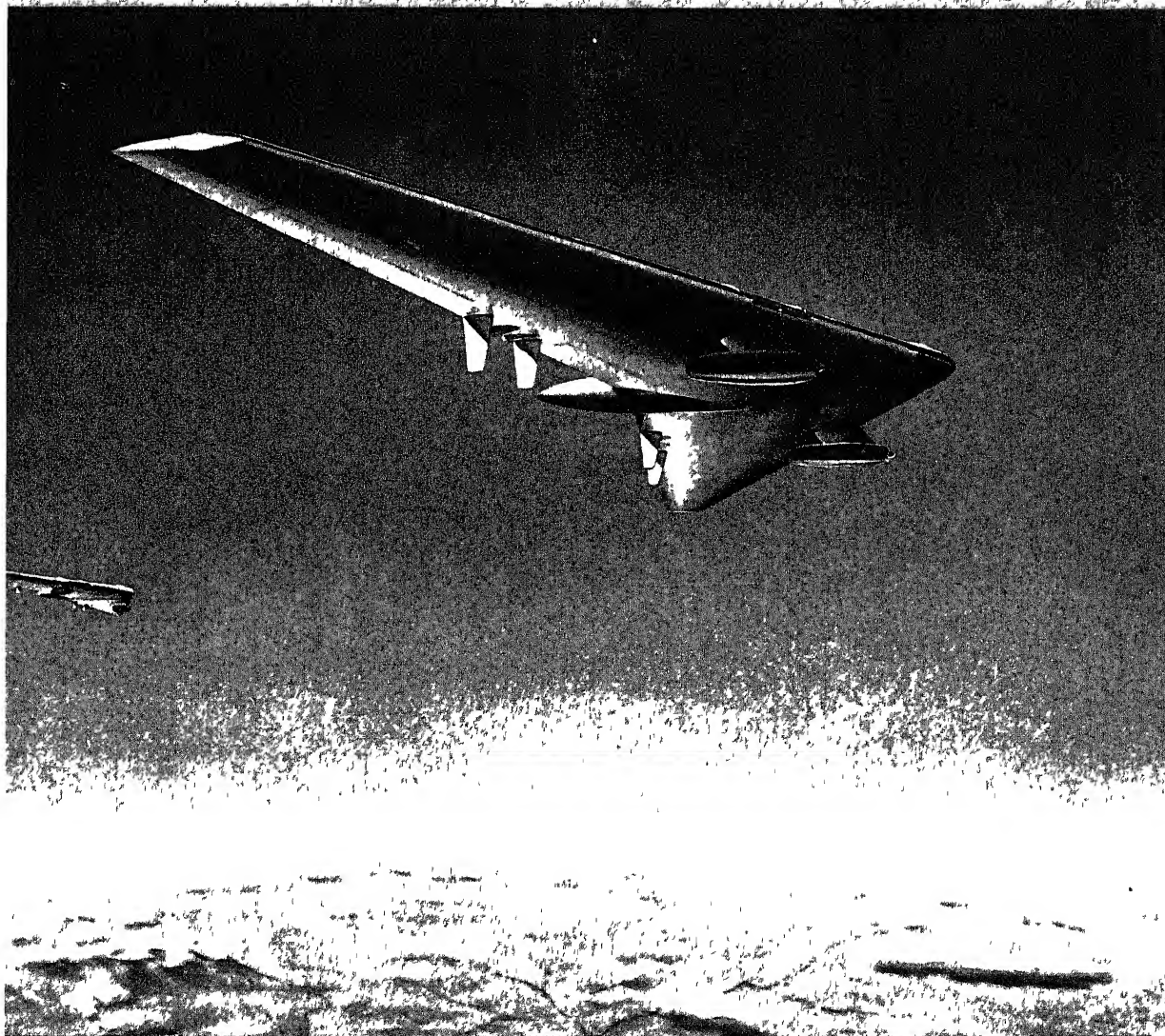
JULY 23, 1949

SCIENCE NEWS LETTER



®

THE WEEKLY SUMMARY OF CURRENT SCIENCE



Wing-Suspended Jets

See Page 60

New Delhi

A SCIENCE SERVICE PUBLICATION

VOL. 56 PAGES 49-64

ENGINEERING

Gasifier Converts Coal

This may prove a cheaper way of deriving gases to be used for making synthetic liquid fuels. The method does not require the use of coking coals.

➤ A NEW TYPE continuous gasifier for use in the process of making synthetic liquid fuels from coal has successfully passed a full-scale test run, it was revealed by officials of the U S Bureau of Mines. The installation is in the Bureau's demonstration plant located in Louisiana, Mo.

This new type gasifier does not require the use of coking coals. Briefly, its cycle involves first crushing, pulverizing and drying the coal. Then, suspended in oxygen and accompanied by superheated steam, the coal is fed into both ends of the gasifier. There the conversion to synthesis gas takes place at temperatures up to 2,500 degrees Fahrenheit. The unit is designed to use about 28 tons of coal, 24 tons of oxygen and 35 tons of superheated steam to produce some 2,000,000 cubic feet of the raw gas daily.

Steam required for gasifying the coal is superheated in a pebble heater fired by gas. The oxygen is extracted from the air at temperatures more than 300 degrees be-

low zero Fahrenheit in a Linde-Franklin unit originally used in making chemicals in Germany.

In a four-hour test, approximately 70,000 standard cubic feet per hour of gas was made. The product contained 37% carbon monoxide, 42% hydrogen, 16% carbon dioxide, 4% nitrogen and the rest miscellaneous. Bureau officials are hopeful that they can reduce the carbon dioxide content and obtain a higher yield of still better synthesis gas in later runs after they become more familiar with the operating characteristics of the new gasifier.

The Bureau's efforts are directed toward a cheaper method of converting coal to the gases from which the synthetic liquid fuels, including diesel oil, heating oil and gasoline, are made. Gasification, it states, is the number one cost and process problem requiring solution before competitive gasoline and oil can be made from coal by either of the two basic processes employed in the recently-dedicated plants there.

Science News Letter, July 23, 1949

MINERALOGY

Search for Hidden Ores

➤ IT IS going to take a lot of money to discover new deposits of mineral ores to replace present deposits facing depletion, the United Nations Scientific Conference on the Conservation and Utilization of Resources (UNSCCOUR) will be told at its meeting at Lake Success next August, it was revealed by Dr. Anton Grav of the Kennecott Copper Corporation, New York.

The day of the oldtime prospector, with pick and shovel and grubstake, is largely over. Only a financially strong company can carry out efficiently the search for hidden deposits, the international group will be told by Dr. Gray. Only a government can afford, under present conditions, to carry out adequately exploration for unknown mineral districts.

Mineral deposits for the most part have been found in groups, or districts, in which the individual deposits occur under the same geological conditions and usually contain more or less the same metals. There are, also, what are apparently isolated deposits, although if the truth were fully known many of these probably would not be isolated.

The possibilities of discovery, the costs and the methods that would apply to ex-

plorations for new districts differ greatly from those that apply to explorations within a known district. Searching for an extension to a known deposit, a new ore body, is an easier problem and one being solved continuously by every mining company in the normal course of its development. Dr. Gray expressed the opinion that in the near future most new mineral sources will result from the discovery of extensions to known deposits.

New mineral districts, he indicated, will most likely be discovered only as present inaccessible parts of the earth are made accessible and under the incentive of greater need than we now have for the metals and higher prices for them. There may be mineral districts in the old rocks that are hidden under the sediments of the Mississippi Valley. There may be great mineral deposits under the swamps of the Amazon or beyond the shorelines on the continental shelves.

No prospector could ever find these, no private company could afford to search for them with the methods and tools available today, and yet with increasing geological knowledge and better tools they might be found, he said. Such explorations

will be taken only by, or with the cooperation of, governments, and only as metals become very scarce and dear.

Science News Letter, July 23, 1949

ASTRONOMY

Plan Study of Sun with Balloons over Hudson Bay

➤ COSMIC RAY equipment carried aloft over Canada's Hudson Bay by balloons next month may help tell scientists about the sun's surroundings.

Intensity of cosmic radiation at northern altitudes will be measured by Geiger counters carried up to heights of 20 miles from Churchill, Manitoba. And these measurements may hold important clues to the suspected existence of a constant magnetic field around the sun.

Dr. Martin A. Pomerantz of the Bartol Research Foundation of the Franklin Institute, Swarthmore, Pa., will head the expedition. He will be assisted by Robert J. Kerr and Robert C. Pfeiffer, both of the Foundation.

If the sun has a constant magnetic field like the earth's, then cosmic radiation should remain constant north of a certain latitude. Otherwise, if there is no such field around the sun, the intensity of cosmic radiation will increase as the north pole is approached.

Free-balloon flights, each carrying a four-fold coincidence arrangement of counters, will be launched to make the ray measurements in the North. Data will be transmitted automatically to a receiving station on the ground.

The project is being sponsored by the National Geographic Society and the Bartol Foundation. Cooperating in the study will be the National Defense Board of Canada. This new cosmic ray venture is a part of a continuing program supported by the Air Force and the Office of Naval Research.

Science News Letter, July 23, 1949

GEOLOGY

Canada's Gold Mined in World's Oldest Rocks

➤ GOLD-BEARING rock formations in Canada, in the provinces of Ontario and southeastern Manitoba, constitute the world's "oldest known orogenic belt", states Dr. Patrick M. Hurley of the Massachusetts Institute of Technology in the journal, SCIENCE (July 8).

Age measurements based on radioactivity of rock samples and on helium trapped in the material range from 2,000,000,000 to 2,400,000,000 years. The formation which runs in a fairly continuous belt of volcanic and sedimentary rocks, appears to consist of the roots of an exceedingly ancient mountain range, eroded away no one knows how long ago.

Science News Letter, July 23, 1949

BIOCHEMISTRY

Body Builds Fat in Aging

A theory that a switch in body chemistry takes place in the aging process which changes food utilization places emphasis on a diet in maturity to avoid diseases.

➤ AGING is characterized by a shift in body chemistry toward building up of fat, rather than protein, from food

This new theory, with implications for the problems of cancer, degenerative diseases and diet in maturity, is proposed by Dr. Jean Mayer, research fellow at George Washington University School of Medicine in Washington and Nutrition Officer of the United Nations Food and Agriculture Organization

In a very young animal, he found, an increase by five grams (approximately one-fifth of an ounce) represents about one part by weight of protein and four parts of water and minerals, or an energy content of roughly five calories. But an increase of five grams in an older animal may represent all fat (five grams), or 45 to 50 calories

Growth and weight increase, therefore, are not exactly equivalent. A given weight increase may mean something quite different in a child and in a grown-up. In the progressive slowing and stopping of growth and beginning of the aging process, there is a change from one type of food utilization to another, but not a sudden decrease in the efficiency of food utilization

Dr. Mayer sees in his theory a warning on diet for grown persons. In a report to the journal, *GROWTH* (June), he states

"A diet promoting good, economical growth in youth tends to promote fat deposition in adulthood, and possibly the development of degenerative diseases and malignancies (cancer)

"The assumption that diets judged adequate in growth studies (that is, for growing children or animals) are good maintenance diets (for grown-ups) appears particularly dangerous in this light"

In cancer cells he thinks there may be a sudden or a progressive reversal from the adult characteristic of fat synthesis to the youthful characteristic of protein building. In this the cancer cells are like the "potentially immortal" cells or tissues that are kept growing for years in artificial cultures outside the body. The "potentially immortal" tissues show that if certain glandular influences are withheld, the cells or groups of cells continue in the pattern of protein building and are not submitted to the process of aging

The glandular influence fits into Dr. Mayer's theory because the change in the pattern of food utilization corresponds to the glandular shifts that come at the beginning of the teen age. On the glandular side there is at this age a shift from a pre-

ponderance of growth hormone to a preponderance of the fatlike steroid hormones, such as the sex hormones

Science News Letter, July 23, 1949

PSYCHOLOGY

Racial, Religious Hatreds May Stem from Self Hate

➤ IF A man hates or despises Negroes, Jews, foreigners, and so on, it may be because he hates and despises himself

This is the implication of a study made at the University of Chicago by Dr. Elizabeth T. Sheerer, now of Iowa State College. Intensive study of therapeutic interviews with 10 persons revealed a "definite and substantial" relation between the individual's regard for himself and that of his feeling toward others

It was also found to be possible to improve acceptance of and respect for the self by the psychological treatment. There was also found to be an even closer relation between regard for self and regard for others after the finish of the treatment period

When the individual's statements about himself were rated on a five-point scale, the average for the first interview was 2.2. The statements about other people rated 2.6. In the last interview the statement on self rated 3.9 while those reflecting on others had gone up to 3.8

Dr. Sheerer foresees applications of her findings toward the solution of social problems

"It might mean," she says, "that increased acceptance of minority groups, foreigners, and the like, could best be achieved by some type of group therapy which would tend to alter the individual's acceptance of and respect for himself."

"It might mean that in situations of industrial tension, or professional friction, the most effective means of approach would be through dealing with the attitudes of the person toward himself, rather than devoting our energies to the expressions of, and descriptions of, the external 'causes' of the tension"

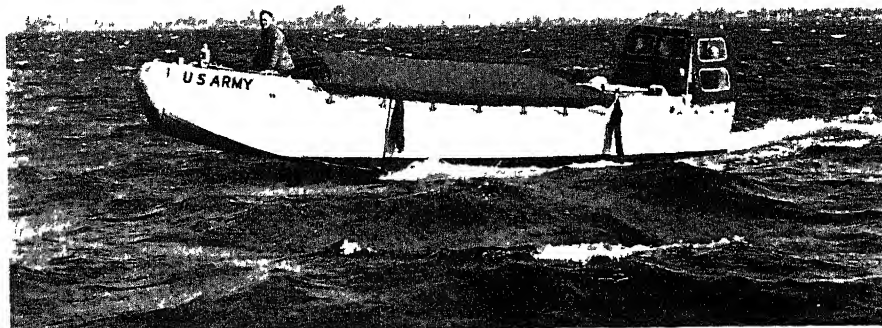
Details of Dr. Sheerer's study are reported in the *JOURNAL OF CONSULTING PSYCHOLOGY* (June)

Science News Letter, July 23, 1949

PSYCHOLOGY

Officers Learn To Read At 488 Words Per Minute

➤ AIR FORCE officers who have completed training in the Pentagon's new Reading Improvement Laboratory are now reading 66% faster than they were six weeks ago



SECTIONAL CARGO BOAT—Built in three parts, and easily disassembled, this 32-foot, all-aluminum, Army cargo boat was designed so that it can be transported in a cargo plane, and is intended especially for Arctic operations. The rear section, with its 60-horsepower engine, can be used as a separate power unit to propel rafts and barges.

The average reading rate for the 120 officers when they entered the class was 292 words per minute with 83.2% comprehension of what they read. On completion of the course, their reading rate had gone up to 488 words per minute in spite of the fact that the test used was more difficult. But their comprehension had dropped slightly to 79.3%. The next class will be cautioned to take it a little easier so as not to sacrifice any of their comprehension.

The slowest reader on entering was an officer who painstakingly read every word and back-tracked frequently to make sure of getting everything. His speed was only

106 words per minute but his comprehension was perfect—100%. On "graduating", this officer read at the rate of 226 words per minute, more than a 100% improvement in speed, and he did not lose anything in understanding. His comprehension score was still 100%.

Fastest reader in the group on entering was a Colonel who read 456 words per minute with 80% comprehension. On completion of the course, the Colonel scored 810 words per minute with 70% comprehension.

Training in the Reading Improvement Laboratory is under the direction of Maj B E Prater (See SNL, July 16 p 39)

Science News Letter, July 23, 1949

benadryl seems to have a sedative effect on the central nervous system, and in certain cases infants who have been unable to sleep owing to restlessness or colic repose quietly after a few doses."

Science News Letter, July 23, 1949

RADIO

Saturday, July 30, 3 15 p m, EDST
"Adventures in Science" with Watson Davis, director of Science Service, over Columbia Broadcasting System

Dr Kenneth E Appel, professor of psychiatry, Medical School of the University of Pennsylvania, in Philadelphia, will talk about "Rules for Successful Living"

SCIENCE NEWS LETTER

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MEDICINE

Infant Diarrhea Relieved

► COMBINING an anti-allergy drug, benadryl, with a sulfa drug brought rapid improvement in 40 babies suffering from infant diarrhea, Dr C Zahra Neumann of the Royal Malta University reports in the BRITISH MEDICAL JOURNAL (July 16).

Infant diarrhea, known medically also as infantile gastroenteritis, is the serious disease which has many times swept through hospital nurseries, often killing large numbers of babies. It is believed to be an infection but scientists in years of search have been unable to pin the cause to a single germ. Many different remedies have been tried, but no one has been universally successful.

Dr. Neumann believes that the symptoms of the disease can be explained, at least in part, as a sign of histamine poisoning. Histamine is a chemical normally formed in the body. Among other actions, it stimulates stomach secretion. Given experimentally in large enough doses it can bring on vomiting and diarrhea, often with strong colicky pains.

Release of too much histamine in the body is believed to play a part in allergies such as hayfever, hives, and asthma. Many modern anti-allergy drugs, such as benadryl, are really anti-histamine chemicals.

When benadryl and a sulfa drug, sulfamezathine, were given in combination to 40 babies, the diarrhea stopped in five days, Dr Neumann reports. There was only one death, compared to three in 42 babies treated with the sulfa drug alone, and four out of 24 babies treated by a short period of starvation except for salt and sugar solutions given by mouth or vein.

Other favorable effects from the combination of drugs were, Dr Neumann reports, "the very quick disappearance of toxic (poisoning) symptoms."

Vomiting stopped in a very short time. Prostration, difficult or labored breathing and rapid pulse subsided in most cases in a few hours.

"The continuous and irritating whine," Dr Neumann states, "is replaced by a more peaceful cry. This is not surprising, as

Question Box

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ENGINEERING

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How may coal be converted into gases more cheaply? p 50

How is the life of quartz crystals increased? p 54

What is unique about the new mechanical spring? p 53

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MEDICINE

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RADIO

What discovery aids the prediction of conditions for long-range radio transmission? p 55

MEDICINE

Plastic False Lung Made

It is shaped to fill a lung cavity in patients who have had a lung removed due to TB or cancer. Purpose is to keep neighboring body parts in place.

➤ A FALSE lung, made of a plastic material shaped into a bag and filled with fiberglass, may become the newest thing in human spare parts to replace those lost because of injury or disease.

The false lung, under experimentation now at the Mayo Clinic in Rochester, Minn., would be used to fill the hollow space left when a lobe or an entire lung is removed surgically in cases of tuberculosis or cancer. It would not, of course, do any breathing.

The need for such a lung and results of experiments to date were reported at a staff meeting of the clinic by Drs. John H. Grindlay, O. Theion Claggett and Arthur H. Bulbulian.

When a lung or a lobe of a lung is removed, the body tries to obliterate the space. Dr. Claggett pointed out. This is done by a raising of the diaphragm, a shift of the partition between the lung sacs, narrowing of the spaces between the ribs and overexpansion of the remaining lung tissue.

Usually this is accomplished without any serious disturbance or disability, particularly in young people. But in cases where the operation has been performed for tuberculosis, overexpansion of the remaining lung tissue is "highly undesirable" because it may light up tuberculous infection in the

remaining lung. And cancer of the lung, chief condition for which an entire lung is removed, occurs most often in older patients who do not have very elastic tissues and consequently can stand least well the overexpansion of the remaining lung.

The first false lung tried by the group was a sheet of polythene made into a lung-shaped bag by fusing the edges together with heat and pressure. This bag, however, had some mechanical defects. In eight dogs on whom it was used, it burst and the non-sterile interior of it caused infection which killed the dogs. Two more out of a series of 21 died because of injury produced by the sharp seam of the bag on neighboring blood vessels. But nine dogs are still alive eight to 12 months after the operation.

An improved false lung has since been made of another plastic, methyl methacrylate. This is lucite or plexiglass. It is thin-walled, lightweight, has a perfectly smooth surface and has been shaped to fit the lung cavity. It was first tried on another series of dogs four to five months ago. So far, the dogs are all well and X-ray pictures have shown no signs of leaks of their false lungs.

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ENGINEERING

New Mechanical Spring

➤ A UNIQUE mechanical spring that becomes easier to deform as a load is continued to be applied has been developed by W. J. Cook, of the Hunter Spring Company, Lansdale, Pa., and many applications for its use in the mechanical world are promised. It is reported to be unlike all other springs.

Everybody knows that in winding a clock, it becomes harder to wind as the spring is tightened. Mechanics know that with the familiar coil spring, a little pull will start the lengthening of the coil but as it grows in length a stronger pull is required to continue the action at the same rate. The new spring, called the neg'ator, acts contrary to accepted engineering principles, and resists less the more it is deformed from its normal condition.

The secret of the new spring, Mr. Cook states, lies in pre-tensioning each successive increment of length of a flat strip by a predetermined, but not necessarily constant, amount. In its relaxed position the device forms into a tight coil, each turn pressing

on the others. In use, this new type of spring is progressively unwound, or drawn out like a tape rule, over its range of action. Its resisting force is developed as each successive length of the metal strip is drawn off the coil, and is straightened thereby. The force required to do this varies inversely as the radius to which the metal strip has been prestressed at that point.

Obviously, he continued, if the neg'ator is heavily prestressed near the free end and only lightly prestressed farther along the coiled length, the device will pull back more at the beginning of its range of action than at the end of the action.

Among applications in which the device may be found valuable, are in toasters, delicate instruments, hose wrapping, extension or compression spring, automatic coiling device, a friction band, a telescopic tube form, and many others. It has a wide range of action, up to 50 times any original dimension, and can act around corners and through small openings with the same

freedom as non-elastic bands or cables. This new spring gives promise of greatly influencing the future of mechanical design.

Science News Letter, July 23, 1949

VETERINARY MEDICINE

'Teen-Age Boy Wins Prize For Devotion to His Dog

➤ A BOY'S devotion to his dog received recognition and reward when the 1949 National Humane Act Award of the American Veterinary Medical Association was presented at their meeting to Richard Rose, 17, of Detroit, together with a \$100 U. S. savings bond.

When Richard was an 18-month-old baby he was given a bulldog puppy named Jiggs. Boy and dog grew up together, but the inevitable tragedy occurred, for while Richard was still young Jiggs became, for a dog, very old, and began to go blind.

An operation to save the dog's sight was attempted, but it was unsuccessful. Richard gave up most of the fun a 'teen-ager likes, to take care of his old companion. He built a headgear equipped with bumpers, to save Jiggs from running into things.

Veterinarians think this type of headgear will be useful in making life easier and less risky for other blind dogs.

The Humane Act Award of the AVMA is given each year after a consideration of cases of kindness to animals to which its attention has been called.

At the same meeting, the Association's



DEVOTION BRINGS AWARD—
The 1949 National Humane Act Award of the American Veterinary Medical Association was granted Richard Rose for building a headgear equipped with bumpers, to save his dog from running into things.

highest honors to a member of the veterinary profession were conferred on Dr. Gerard Dikmans, who came to this country as a 19-year-old immigrant from the Nether-

lands in 1905. A graduate in veterinary medicine from Michigan State College, he has made a life-time study of animal parasites and the diseases they cause.

Science News Letter, July 23, 1949

ENGINEERING

Long-Lived Crystals

➤ QUARTZ crystals, essential in radio and television, will have practically unlimited frequency-control life without deteriorating as a result of a heat-treatment process revealed at the laboratories of the U S Army Signal Corps, Fort Monmouth, N J, where it was discovered.

The process involves superheating the crystal to approximately 900 degrees Fahrenheit, followed by slow cooling. Finished blank crystals are placed on a conveyor belt and passed through an electrically heated oven for a period of from two to three hours, then subjected to cooling through a 24-hour period.

The job of the quartz crystal in all types of radio transmission, and in other electronics, is to keep the emitted signals on their assigned radio-wave frequency. But these crystals age in use, permitting the

signal to slide or "drift" away from the desired frequency. They must then be replaced. A crystal which has been subjected to the new Signal Corps process, however, will hold to the desired channel indefinitely, and probably will never have to be replaced.

The discovery, made by Arthur C. Prichard, Maurice A. A. Druesne and Dr. David G. McCaa of the Signal Corps laboratories, is of vast importance not only to the armed forces but to civilian radio, television and communications, in all of which great quantities of quartz crystals are now used. They are imported products, because few satisfactory crystals have ever been found in United States. Had this new method been available during the recent war, many millions of dollars spent for replacements would have been saved.

Science News Letter, July 23, 1949

ENGINEERING

Steel-Making in Russia

➤ SOVIET RUSSIA is reported to be spending two billion dollars, the estimated cost of the American development work on the atomic bomb, on a new method of making steel. This huge expenditure is listed in the ANNALS OF THE AMERICAN ACADEMY OF POLITICAL SCIENCE (May).

Dr. Gerald Oster, physical chemist at the University of London, says that the huge sum is being spent by the Soviet government on steel plants in the Donbas and Soviet Asia. The process, which uses pure oxygen or oxygen-enriched air in the blast used to make steel, is being used more or less widely in this country.

USSR development of the use of oxygen in steel making is based on the work of Russia's best known atomic scientist, the English-educated Dr. Peter Kapitza, the report explains. Dr. Kapitza has developed a turbine for producing large quantities of pure oxygen more quickly and cheaply than previous methods.

In the new oxygen process, cost of making steel is said to be reduced 25% to 30%.

Another important industrial use of oxygen in the Soviet, Dr. Oster states, is in work on burning coal underground to produce gas. Proposed by famed Russian chemist, Mendeleev, in 1888, underground gasification of coal was first experimented with by the Soviets in 1931. Dr. Oster says American scientists also are working on this.

Dr. Oster, who was formerly a research associate at the Massachusetts Institute of Technology and Princeton University and was on the staff of the Rockefeller Institute for Medical Research, praises Soviet planning of scientific research. The way research is organized in the USSR, he terms "comparable" to the program of American and British work which produced the atomic bomb.

Soviet mathematics is lauded in the same publication by a Princeton University mathematician.

Mathematical developments in the USSR, comments Dr. Solomon Lefschetz, "parallel those in the United States with equal energy and vigor in research."

Importance of Soviet mathematical work is indicated by the fact that many young American mathematicians are learning scientific Russian just to read of work done by the Soviets. Dr. Lefschetz declares.

Science News Letter, July 23, 1949

NUCLEAR PHYSICS

Plastic Balloons To Carry Instruments Higher

➤ SUPERBALLOONS of thin, tough plastic will soon carry scientific apparatus weighing as much as two men to greater heights above the earth than now achieved,

it was learned at the University of Denver International Cosmic Ray Symposium in Idaho Springs, Colo.

Much information about cosmic rays from outer space has been obtained from recorders and photographic plates hung from balloons that rise 18 to 20 miles upward in the Office of Naval Research "Operation Skyhook." At their highest altitude these bags filled with helium gas are about 75 feet in diameter and scores have been launched from Camp Ripley, north of Minneapolis.

Some of the flying saucers that have been reported were undoubtedly these high-flying balloons shimmering in the sky. The unaided human eye can see these balloons even 20 miles high.

The new balloons are made bigger and better by use of a process of welding the very thin film of polyethylene plastic of which they are composed. Ordinary Scotch tape was used in the beginning to put the balloons together, and while special adhesives are now available, the welded seams will make possible hundred-foot-diameter balloons. Several miles higher will be reached with these new balloons, and this is expected to capture incoming cosmic particles, less impeded because of the even rarer atmosphere at such great heights.

With a lift of about 300 pounds provided by three balloons, larger loads of cosmic ray counters and photographic plates will be sent upward to regions that man cannot visit. Usually only one balloon carrying less weight will be used.

This apparatus is parachuted back to earth when the balloons reach their greatest heights, and the messages they carry help explain the mysteries of how matter is put together.

Science News Letter, July 23, 1949

BIOLOGY

Chart on Mammals Lists Biologic Characteristics

➤ IF YOU know the weight of an elephant's brain, you can get at a glance such data as his water intake and body weight. Or you can spot the weight of a mouse's liver, if you know his heart beat.

These are some of the possibilities with a chart developed by Dr. E. F. Adolph of the University of Rochester. Dr. Adolph's chart, published in the journal, SCIENCE (June 10), listed 34 properties of mammals including man. The relationships between these 34 biological characteristics have been established so that with the chart, a ruler and any one of the measurements, you can immediately read off any of the other 33 for a particular mammal.

Relationships on which the chart is based apply to physiological processes, sizes of organs, numbers of reduplicated structures and biochemical compositions.

Science News Letter, July 23, 1949

RADIO

Long-Range Transmission

Discovery of like-ionospheric characteristics on opposite sides of the earth will aid in predicting conditions for long-range radio transmission.

► **PREDICTING** conditions for long-range radio transmission will be aided by recent findings at the National Bureau of Standards which makes possible a more complete picture of world-wide conditions of the ionosphere. This is the layer of electrically charged atmosphere high above the earth that reflects radio waves and makes long-distance radio transmission possible.

Important in the findings is that the ionospheric characteristics at any point on the earth are almost identical with those at a point on the other side of the earth directly opposite. Scientists call such positions antipodal points. Baton Rouge, La., and Watheroo, western Australia, are antipodal points at which testing stations are located. It has been found that Watheroo is as efficient for predicting Baton Rouge as it is for predicting Brisbane in eastern Australia.

For many years, much study has been given to the ionosphere, which scientists think is a series of ionized layers in the atmosphere some 50 to 250 miles above the earth. It is thought to be made electrically conducting through the action of ultraviolet light. Radio waves traveling in straight lines through the lower atmosphere are bent away from the vertical as they penetrate the ionosphere at an oblique angle. Certain frequencies are returned to the earth's surface, where they are reflected back toward the ionosphere. Were it not for these alternate reflections by the earth and ionosphere, it would be impossible to transmit any but purely local messages on high frequencies.

The ionosphere continually exhibits fluctuating characteristics because of changes in the amount of ultraviolet light it receives from the sun. The study of solar activity as evidenced by sunspots thus becomes a means of predicting ionospheric conditions. The earth's magnetic field also plays an important part in the distribution of ions. Other variations of the ionosphere with locality, season, and time of day or night constitute a complex geophysical phenomenon.

Daily "soundings" of the ionosphere are now being taken all over the world by an international network of 53 ionosphere stations, 14 of which are operated by the National Bureau of Standards. These stations collect data by emitting pulses of radio waves vertically upward and receiving their reflections with radar-like equipment.

In addition to other information, the daily soundings measure the heights of

the various layers in the ionosphere and indicate the degree of absorption of radio energy. This is related to the power required to transmit a given frequency over a particular distance. All the information obtained by the soundings is correlated with sunspot predictions to provide the working data used by the Bureau in predicting radio propagation conditions.

One over-all result of the work at the Bureau, which establishes the possibility of utilizing antipodal stations, is effectively to double the number of ionospheric sounding stations now available for prediction purposes. Gladys White and R. F. Potter of the Bureau staff are given credit for the achievement.

Science News Letter, July 23, 1949

BOTANY

Electricity May Help Insect-Catching Plant

► **MEASUREMENTS** showing a tiny electrical voltage from Venus' flytrap, a famed insect-catching plant, may help explain the operation of this strange death trap for flies, spiders and other insects.

Otto Stuhlman, Jr., of the University of North Carolina, told the American Physical Society in Cambridge, Mass., how the electrical measurements were made on the plant. The small voltages ranged from five-hundredths of a volt for summer growth plants down to one-hundredth in winter growth plants. The voltage changes moved from trigger hairs on the leaf across the leaf to the closure mechanism at a speed of about an inch a second.

Venus' flytrap has hinged leaves which operate on luckless insects in the manner of a common steel trap. The spike-like trigger hairs on the leaf start it closing.

The plant, found in some parts of North Carolina, was once called by Darwin, "the most wonderful plant in the world." Its diet includes at least as many spiders as flies, plus even such items as small toads.

Science News Letter, July 23, 1949

ENGINEERING

Ultrasonic Generator Utilizes Quartz Crystals

► **WAFER-SHAPED** quartz crystals, similar to those used to control radio wave frequency in transmitting stations, are employed in a new ultrasonic generator, a research device which emits sound waves

pitched above the range of human hearing.

Generators of ultrasonic waves have become more or less widely used in the past few years in laboratories, and practical applications are rapidly developing. These high frequency waves produce heat in objects in their path. They will kill insects, and also have killed white mice. Possible uses include the sterilization of foods, medical treatment, elimination of smoke, speeding up chemical reactions, homogenizing milk, and many other applications in biological, chemical and physical fields.

This new ultrasonic generator, which utilizes quartz crystals to produce the "silent" sound waves, is a product of General Electric. The crystals vibrate when electric voltages are applied across them. The wave frequency is dependent upon the size of the crystal. C. F. Falk, General Electric engineer, stated. They are roughly similar in size and shape to a hockey puck.

The new equipment is contained in a cabinet which resembles a small floor-model radio. Mounted on top is a transparent cylindrical case filled with oil within which the crystal is placed. The oil serves to insulate the high-frequency voltage across the crystal, and to transmit the sound waves to the test chamber directly above the crystal. Experiments with ultrasonics are conducted in the test chamber. A glass rod stuck into the chamber for a very short period becomes hot enough to burn holes in the paper.

Science News Letter, July 23, 1949



SILENT SOUND GENERATOR— Quartz crystal, contained in the translucent plastic case on top of the cabinet, generates high frequency sound waves pitched so high that the human ear cannot hear them. The new generator was developed by General Electric for research into the possibilities of putting the inaudible waves to work.

VETERINARY MEDICINE

Blood Disease Like Rh Trouble Found in Dogs

➤ A BLOOD disease like the Rh trouble that affects human babies has been produced in puppies by the same process of antagonism between the blood of the parents that causes the trouble in human offspring.

The cases of the puppies, one of them with jaundice such as develops in human babies with Rh trouble, is reported by Drs. Lawrence E. Young, Donald M. Ervin, Richard M. Christian and R. Wendell Davis, of the University of Rochester School of Medicine, in the journal, *SCIENCE* (June 24).

The mother of the puppies had blood which was Do-negative, on the basis of the scientists' grouping of dogs' blood. She was given transfusions of dog blood cells that were Do-positive. Then she was mated to a Do-positive male. The mother was "mostly pointer" and the father "mostly German shepherd."

Four of the puppies were Do-positive and these were the ones with the blood disease. The other four puppies of the litter were Do-negative and showed no sign of the blood disease.

One case of the blood disease occurring naturally in dogs, newborn dachshunds, has previously been reported. The Rochester experience is believed the first in which the disease was produced by previous transfusion to the dog mother. Better knowledge of the disease as it occurs in human babies may result from further studies with the dogs.

Science News Letter, July 23, 1949

CHEMISTRY-BOTANY

Cheer Up, Bachelors! 2,4-D Poisons Mistletoe

➤ NOTE for determined bachelors: mistletoe, which will develop its dangerous properties six months hence, may be killed now with 2,4-D and its newer companion weedicide, 2,4,5-T.

Information on this newest use of weed-killing chemicals comes from two sources, the Forestry Commission of New South Wales, Australia, and the U. S. Department of Agriculture in Washington.

To be sure, the scientists of the two organizations are not especially interested in discouraging Yuletide romance—most of them are married already. What they are concerned about is saving trees from the sap-sucking activities of various species of mistletoe, for this popular Christmas "green" lives as a parasite on the branches of trees, often stunting their growth and in extreme cases even killing them.

An Australian scientist, D. Hartigan, reports that he has had some success with 2,4-D and related chemicals in attacks on species of mistletoe parasitizing valuable eucalyptus trees. The clumps of mistletoe were browned and withered within three

weeks after spraying, while the trees showed no damage.

In this country, states L. W. Kephart of the Department of Agriculture, 2,4-D and 2,4,5-T are being used in efforts to clear Oklahoma rangelands of scrub oak that has taken possession. Field workers have reported that mistletoe clumps on the branches of these small oak trees succumb to the poison sprays more readily than do the oaks themselves. In this case, both the host-plant and its parasite are weeds, so that the differential effect does not mean much. However, if it proves possible to kill mistletoe without harming more valuable trees on which it grows, this discovery may eventually be significant in the care of street and park trees in mistletoe-infested regions of this country.

The fact that the chemical sprays can harm or kill mistletoe without apparent damage to its host-trees seems to be due to the one-way traffic that obtains in the parasitic life of the plant. Mistletoe sucks sap out of its host-tree but gives nothing in return. Hence it is unable to transmit into the tree any of the poison that is killing it.

Science News Letter, July 23, 1949

ORNITHOLOGY

Bird-Brained Birds Get Drunk or Save Rock "Nuts"

➤ TO ERR is more than just human. Birds, it seems, make mistakes, some of them remarkably like human failings.

Austin L. Rand, curator of birds at the Chicago Natural History Museum, calls the bird boners "maladaptations."

Here are some of them:

Drunken robins, which may become "utterly fearless and perhaps a bit belligerent," get that way from feeding on the berries of the Tartarian honeysuckle. A few dead robins have been found near the shrub, probably poisoned by their berry diet.

Birds which store supplies of food may get more credit from humans than they deserve, some observations have indicated. The California woodpecker saves acorns in holes which he drills in trees. But when the acorn crop fails, the bird still keeps up his storage activities, putting useless pebbles in the holes. Another conserving bird which might have delighted old Ben Franklin was a captive raven which attempted to store small fish by pushing them through a knothole in its cage. Only difficulty was that the fish fell out of the bird's reach when thus stored.

And a scientist in Africa once discovered that birds that lay their eggs in other birds' nests aren't always very careful. The egg of a honey-guide bird was found in the nesting hole of a little barbet. If and when the egg hatched, it would have been impossible for the nestling to get out of its much-too-small home.

Science News Letter, July 23, 1949

ZOOLOGY

Darwin's Theory About Giraffe's Neck Challenged

➤ DARWIN was wrong about the giraffe, declares a London newspaperman-naturalist, Chapman Pincher of the *DAILY EXPRESS*. It got its long neck, not through the necessity for reaching upward into treetops for food but through having to stretch downward to ponds and streams to get water, he holds.

Mr. Pincher believes that the giraffe started out by evolving extra-long legs as a response to constant danger from lions and other beasts of prey. The longer the legs the more easily it could escape, present-day giraffes can work up a speed in excess of 30 miles an hour without tiring very hard. In its case, as in that of other hoofed animals, survival of the fit meant survival of the speedy.

As its forelegs grew longer and longer, it became necessary for its neck to grow longer, too, so that the animal might drink, argues Mr. Pincher. He points out, also, that giraffes often reach downward to feed on grass, as well as upward to feed on tree leaves.

The giraffe's nearest relative, the okapi, has rather long forelegs and a correspondingly long neck and feeds exclusively on leaves, Mr. Pincher admits. However, he counters, the okapi lives in dense forests, where there is nothing to eat but leaves. Therefore, he contends, his long-neck-because-long-legs argument still holds good.

Mr. Pincher's theory of giraffe evolution is proposed in the journal, *NATURE* (July 2).

Science News Letter, July 23, 1949

CHEMISTRY

Shipboard Factory Makes Weed-Killer for Sweden

➤ SWEDEN'S relatively modest needs for a chemical weed-killer are being satisfied by the product of a British factory. But the factory is not in Great Britain; it is in Gothenberg, Sweden. After it has done its work it will go away again.

Answer to the riddle is that the factory is aboard a 600-ton ship that crossed the North Sea and anchored in Gothenberg harbor, prepared to do business. It brought British chemists along on board, additional Swedish workers were hired in Gothenberg.

The product, known to chemists and agriculturists as Phenoxylene, kills ordinary weeds but does not affect grains or most other grasses. Its action is similar to that of 2,4-D, much used in the United States.

Science News Letter, July 23, 1949

ELECTRONICS

Television Will Be Usable In Ultra-High Frequencies

➤ PRESENT day television receiving sets will be usable when ultra-high frequency broadcasting comes into use, a probability of the near future, by use of a new television converter designed by Stanford Research Institute, Stanford, Calif. It is an electronic "step-down" device.

This small device can be used with any standard television set to make it possible to receive signals from stations operating within the ultra-high frequency region, according to Dr. J. E. Hobson, director of the Institute. It is described as an electronic circuit which steps down the ultra-high frequencies to the frequency range for which the present standard models are intended. Present bands assigned to television extend from 54 to 216 megacycles, new bands for probable assignment will be much higher.

This converter has been designed in three types, one for fixed frequencies of 530 megacycles, another tuneable over the 475 to 675 megacycle range, and a third tuneable over the 475 to 890 range. The third is not yet ready for production, but is in experimental use.

The rapid growth of television makes the assignment of new transmission bands essential. The present radio frequency range available to television, from 54 to 216 megacycles, permits the use of only 12 channels. This limits to 12 the number of television transmitting stations operating in any given area.

At the present time, a great deal of experimentation is being carried on with ultra-high frequencies. It is expected that the United States controlling office, the Federal Communications Commission, will soon authorize new channels in the region of 475 to 890 megacycles, and a number of experimental stations are already in operation within this band.

Science News Letter, July 23, 1949

ENGINEERING

New U. S. Standards List Of 1,124 Now Available

➤ AMERICAN Standards, 1,124 in number and covering specifications for American products to protect consumers, are included in a new list issued this month by the American Standards Association. More than 140 have been added since the beginning of the year.

The list is available to those interested without charge. In it are standard specifica-

tions, methods of test, building requirements, safety codes, definitions and terminology in all fields of engineering as well as for materials and equipment used by the ultimate consumer. All of these have been given the status "American Standard" through the procedure of the association which assures all groups concerned an opportunity to have a voice in their development.

The American Standards Association, with headquarters at 70 East 45th Street, New York, is a federation of national groups dealing with the standardization of products. Through it, government, industry, labor and consumer work together to develop mutually satisfactory national standards. It acts also as the authoritative channel for international cooperation in standardization work.

Science News Letter, July 23, 1949

ARCHAEOLOGY

Archaeologists Find Ancient Gambling Joint

➤ A RAID on a popular gambling hell has been conducted by a group of very staid University of California archaeologists.

Not the moral dander of the scientist, was aroused, then interest was purely academic.

The chance to find out how a bunch of slick prehistoric crap-shooters operated was too much of a temptation. There haven't been any boys in this back room for a considerable number of centuries. The proprietors folded, probably before the white man came to America.

Franklin Fenenga and Francis Riddell, archaeologists of the California Archaeological Survey, report that their gambling hell is Tommy Tucker Cave, 200 feet up the side of a slope in Lassen County, near the Nevada line.

Artifacts include more than 800 short wooden counting sticks and dice of the primitive Indian gamblers. The dice are of a kind which no modern crap-shooter would recognize. They were split sections of cane, with one side flat, one side round. They were tossed in a basket, betting was on how many would come up round, how many flat.

A knotted, curved sagebrush stick heavily wrapped with bark at one end—an instrument remarkably suited for breaking heads—gave rise to speculation by the archaeologists that a bouncer may have been needed. A "mural" on the wall, containing a series of pictographs, undoubtedly gave the "joint" the proper atmosphere.

The artifacts indicate that the cave was used for a long period of time, one kind of game succeeding another in popularity.

The cave is situated in territory occupied in historic times by Indians of a Northern Paiute band, the Wadadokado.

Science News Letter, July 23, 1949

AERONAUTICS

Jet Fighter Has Radar Nose Replacing Air-Intake Prow

➤ A RADAR nose replaces the air-intake front of the fast jet-propelled F-84 Thunderjet in a modified airplane now making flight tests, it was revealed by Republic Aviation Corporation, Farmingdale, N. Y. The radar nose is capable of housing equipment for seeking out and intercepting enemy bombers, company officials state.

Side inlet ducts for air-intake replace the former opening which was directly centered on the plane's nose. In the position adopted, they are found to give the desired flow characteristics and pressure recovery, at the same time providing ample room for equipment installations with a minimum change in both structure and aerodynamic characteristics.

This is one in a series of company developments carried out in conjunction with its own experimental and research program, and it should not be construed that the Air Force intends to install this new type nose on present or future F-84s under contract, the company asserts. However, the Air Force has just revealed a new version of the Thunderjet, which will be known as the F-84E, already in production by Republic.

The new version has a 25% increase in pounds thrust, over 50% increase in range, and a service ceiling of over 45,000 feet, or 5,000 feet more than the present model. The nose section of the fighter has been lengthened 15 inches to provide more room for the pilot, and a new cabin pressurization and air-conditioning system will provide pilot comfort.

Science News Letter, July 23, 1949

VETERINARY MEDICINE

Somersaulting Chicks May Lack Vitamin E

➤ BABY chicks that turn somersaults and walk backward instead of in the normal forward direction are not necessarily training for careers in Hollywood or on the television stage. There's a fair chance that what ails them is a lack of vitamin E in their diet. Dr. Erwin L. Jungherr of the University of Connecticut told the meeting of the American Veterinary Medical Association in Detroit.

Poultrymen call the condition "crazy chick disease." Less spectacular symptoms are a tendency to fall over on one side, and a general incoordination of movement. It can happen even to chicks getting enough vitamin E, if their rations also contain food elements that destroy the vitamin in the body. Moreover, certain toxic chemicals, notably coal tar derivatives, can produce symptoms that may be confused with vitamin E deficiency.

Science News Letter, July 23, 1949

ASTRONOMY

Jupiter Now Prominent

But planet, Venus, which is brighter, is seen early on August evenings. Vega, in Lyra, the lyre, is the most brilliant of the stars.

By JAMES STOKLEY

➤ **THOUGH** Venus, seen early on August evenings, is brighter, it is the planet Jupiter that is most prominent now during the night. Venus, of magnitude minus 3.4 on the astronomical scale, is some 12 degrees above the western horizon at sunset, so it can be seen in the gathering dusk, but by the time the sky is fully dark it has dropped from sight. Not until October will it remain in the sky much after the end of twilight.

Jupiter is now only about a third of Venus' brightness, of magnitude minus 2.2. However, it is seen against a dark sky background, and that makes it more conspicuous. Its position is shown on the accompanying maps. These give the appearance of the skies at about 10:00 p. m., your standard time, at the first of August, an hour earlier at the middle of the month, and two hours earlier at the end. (Add an hour if you are on daylight time.)

Teapot Shape

The planet is in the constellation of Sagittarius, the archer, in which the stars can be seen to outline the shape of a teapot. Towards Jupiter (just above the U in the word Sagittarius) are four stars which mark the handle. The spout is to the right, just above the curved row of stars which form the tail of Scorpius, the scorpion. Also, in Sagittarius, is a dipper, the so-called 'milk dipper.' The four stars that make up the handle of the teapot are the bowl of the dipper, and the handle extends up toward the M in the name of the constellation of Scutum, the shield.

In Scorpius is the bright star, characteristically red in color, Antares. The name means "rival of Mars," because that planet, which is not now visible, is also famous for its redness.

Most brilliant of the stars, rather than planets, which can now be seen, is Vega, in Lyra, the lyre, practically overhead for the times of the maps. Just east of this group we see Cygnus, the swan, part of which forms a cross-shaped figure often called the northern cross. The star Deneb is at the northern end of the cross. Lower than Cygnus, in the south, we can find Aquila, the eagle, with first-magnitude Altair.

Looking toward the northwest, we can see the big dipper, part of Ursa Major, the great bear. As is well known, the two lowest stars in the dipper, as it now stands, are

the pointers. They indicate the direction of the north star, Polaris, which is at the end of the handle of the little dipper, and thus, in turn, is part of Ursa Minor, the lesser bear. Following the curved handle of the large dipper around toward the west, we come to the bright star Arcturus, which is in the figure of Bootes the bear driver.

Many features lend interest to Jupiter. For one thing, it is the biggest of the nine major planets that revolve around the sun. Its mean diameter is 86,850 miles, as compared to 7,927 miles for the earth. Thus its volume is more than 1,300 times that of the earth, yet its density is much less, and its mass is only 318 times that of our home planet.

Through a telescope, Jupiter has a noticeably oblate, or "door-knob," shape. Its diameter from pole to pole is 5,760 miles less than at the equator, and the reason for this is found in its rapid speed of rotation. Even though it is so big, it makes one turn on its axis in 9 hours 55 minutes and the centrifugal force throws the material at the equator relatively far from the center. There is a similar effect with the earth, but because of our smaller size and slower rotation the bulge is much less. Our equatorial diameter is only about 27 miles greater than that measured between the two poles.

Knowing the mass of Jupiter, and its rotation, astronomers have been able to calculate how much the bulge should be, if the mass were uniformly distributed, and they find that it should have a much larger bulge than it does. This indicates, therefore, that the planet is not uniform in density, but that there is a considerable concentration toward the center, surrounded by outer layers so low in density that they must be gaseous.

This is confirmed by the changes that

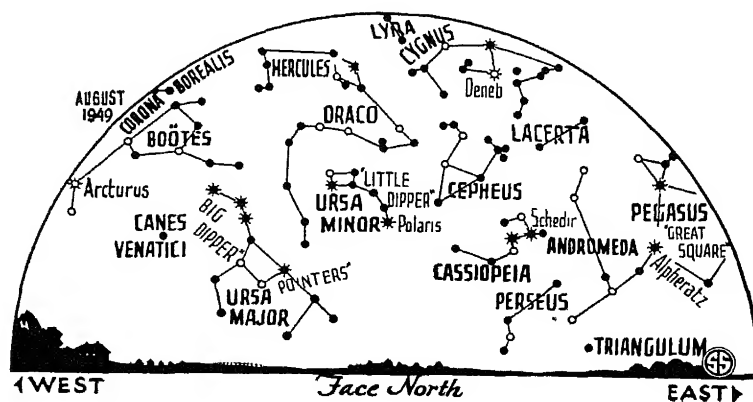
are observed on the surface of Jupiter, and which could not occur in a solid planet. There are red and brown belts, which cross its face parallel to the equator but which vary from time to time both in width and number. Other marks have come and gone, particularly the "Great Red Spot," an elliptical region some 30,000 miles from east to west and 7,000 miles from north to south. This first appeared in 1878, and was brick red in color. Later it faded, although the outlines can still be detected. It did not remain fixed but drifted around, and also shifted in latitude. No one knows its cause, but it was certainly part of a gaseous surface.

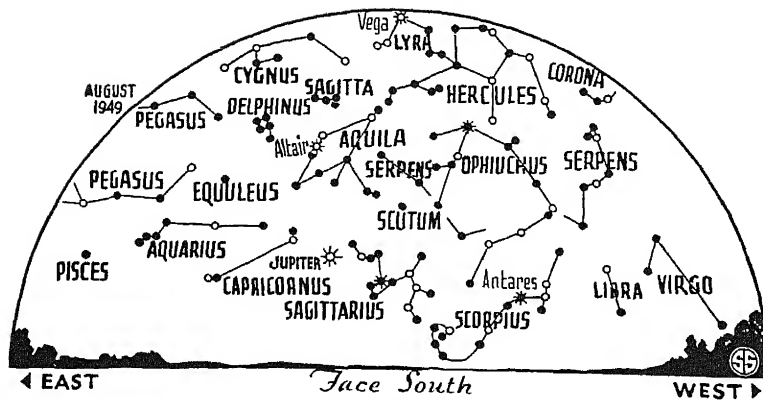
Jupiter Is Cool

Until a few years ago astronomers thought Jupiter was quite hot, and that heated currents of gases caused turbulence which accounted for the changes. Measurements, however, have shown it to be quite cool, about 184 degrees below zero, Fahrenheit. If it received heat only from the sun, it should be still colder, about 220 degrees below zero, so possibly there is some internal source of heat, such as volcanic activity, which may account for the change.

Analysis of the light of Jupiter through the prisms of the spectroscope, showed it to be mainly reflected sunlight, though dark bands were observed in the orange and red parts of the spectrum. The explanation of these came in 1932 from a young German astronomer, Rupert Wildt, who is now at Princeton. He showed that these absorptions would be caused by methane, or marsh gas, and ammonia. This was confirmed shortly afterwards by Dr. Theodore Dunham, at Mt. Wilson Observatory, who produced similar bands in the laboratory when he passed light through these gases in a pipe 60 feet long.

In addition to methane and ammonia, the atmosphere of Jupiter is also believed to contain hydrogen, though the bands that gas would produce cannot be observed. If there were even any nitrogen, which constitutes the bulk of the earth's atmosphere,





* * * • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS

it has probably all been combined with hydrogen to form the ammonia. Any oxygen would have probably combined with the hydrogen to form water, which in turn has probably frozen and fallen far out of sight.

Thus, according to Wildt's hypothesis, the structure of Jupiter is as follows: At the center is a rocky-metallic core, with a radius of about 37,000 miles. Then comes a layer of ice, a frozen ocean 34,000 miles deep and then the outer layer of gases, some 16,000 miles deep, of frozen ammonia in an atmosphere of hydrogen and methane. Dr. F. L. Whipple, of Harvard, has suggested that there may be no sharp transition between these layers, but that the clouds gradually become thicker with depth, finally turning into a layer of am-

monia slush which still farther down becomes solid. Surely not a very attractive home for any imaginary inhabitants!

Time Table for August

Aug	EST	
1	7 57 a m	Moon in first quarter
6	9 48 p m	Moon passes Jupiter
8	2 33 p m	Full moon
12	early a m	Meteors of Perseid shower visible
13	3 00 p m	Moon farthest, distance 251,600 miles
16	5 59 p m	Moon in 1st quarter
23	10 59 p m	New moon
26	9 58 a m	Moon passes Venus
30	2 16 p m	Moon in first quarter

Subtract one hour for CST, two hours for MST, and three for PST

Science News Letter, July 23, 1949

ASTRONOMY

Survey Milky Way Stars

► **BRIGHTEST** stars of the Milky Way are being surveyed by wide-eyed Schmidt telescopes in the United States and Mexico, the American Astronomical Society was told in Ottawa, Canada.

A 48-inch Schmidt telescope on Palomar Mountain in California is to be used in photographing the sky for a new astronomical atlas (See SNL, June 25, p. 406), but the survey of the Milky Way's bright lights is already well along elsewhere, American and Mexican scientists reported.

Schmidt cameras at the Warner and Swasey Observatory of the Case Institute of Technology, East Cleveland, Ohio, and at the Tonantzintla Observatory in Mexico are being used to search for high luminosity stars of the Milky Way galaxy. Collaborating with Dr. J. J. Nassau, director of the Warner and Swasey Observatory, are Dr. W. W. Morgan, Yerkes Observatory of the University of Chicago, and Dr. Paul Annear of Baldwin-Wallace College. The Mexican research is directed by Dr. L. E. Erro.

Because the Mexican observatory is far-

ther south, it can search areas of the sky invisible or too low for satisfactory observation from Cleveland. Photos made by both the observatories are expected to cover most of the Milky Way.

Results of the survey will give a fairly good picture of the intrinsically brightest stars up to distances of 32,000 light years from the earth. (A light year is the distance light, with a speed of 186,000 miles per second, travels in a year.)

The Schmidt telescopes in this survey photograph a field of stars through what is called an objective prism, a huge piece of optical glass whose two sides are inclined to each other a few degrees. The telescope photographs short rainbow-colored bands of starlight, known as star spectra. From these spectra, the brightest stars can be easily picked out from those of less luminosity.

The program at Case is carried out jointly with the Yerkes Observatory and is financially supported by the Office of Naval Research.

Science News Letter, July 23, 1949

BLACK LIGHT

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ENGINEERING

River Basin Planning

➤ A NEW river-basin-planning technique is now being applied in the American development of hydroelectric power. It takes into consideration all the possible uses of the water in the basin, for domestic purposes, irrigation, navigation and recreation, as well as the need for flood-control.

This technique may be described as a new branch of engineering, combining hydraulic, civil and electrical engineering into "river-basin engineering," the UNSCCUR will be told at Lake Success this summer by Leland Olds of the American Federal Power Commission. UNSCCUR is short for the international group the full name of which is the United Nations Scientific Conference on the Conservation and Utilization of Resources.

The essential elements in the new program, he will explain, include viewing the entire river as a physical unit to be developed rather than limiting the planning to individual projects. The needs within the entire river basin for the various water uses are appraised in terms of their relation to and effect upon the development of power.

Various alternative plans for dams, reser-

voirs, waterways, and power plants are laid out upon a multiple-purpose water use basis, and analyzed physically and economically to determine the best plan for power consistent with the other water uses. The various plans are weighed in terms of the construction and operation of the river system upon existing improvements, and particularly upon the flooding of agricultural lands.

Cardinal to all plans studied is the adequate control of the stream through storage reservoirs. Because of the impact of inundations due to storage in the more highly developed areas, he will say, large reservoirs are generally found more practicable in the headwater and tributary streams, with developments only for pondage and power head on the main stem of the stream.

Analysis of the economic feasibility of hydroelectric developments is based on the most economic alternative source of power, which is generally steam-electric. These two sources of power, however, are not looked upon as competitive, but as having their own peculiar characteristics and values achieved through their complementary use.

Science News Letter, July 23, 1949

ENGINEERING

Ocean-Spanning Rockets

➤ OCEAN-SPANNING rockets, and even rockets that may circle around the earth and remain aloft for weeks, may be looked upon as probabilities, Dr. H. L. Johnston of the Ohio State University declared. He spoke as a guest of Watson Davis, director of Science Service, on Adventures in Science, heard over the Columbia network.

In order to cross the ocean a rocket would have to gain a speed of about 9,000 miles an hour shortly after takeoff, he said. To circle the earth like a miniature planet at, say, 1,000 miles altitude, a rocket speed of 22,000 miles an hour is necessary. With a little more speed, 25,000 miles per hour, the rocket could be sent to the moon or into outer space like a Buck Rogers space ship. The great essential in acquiring these speeds is proper fuel.

Only a fuel like hydrogen has the potentiality of giving a rocket the necessary acceleration to allow it to escape from the earth although some other fuels might be used, he asserted. Hydrogen itself would accomplish the job more easily if one or more "booster" rockets are employed to accelerate the main rocket before its own engine starts firing.

Dr. Johnston described experimental work of the past two years at Ohio State with rocket motors that use liquid hydrogen as

a fuel and liquid oxygen to enable the hydrogen to burn. The rocket motor carries its own supply of oxygen. All other engines, including those not widely used in jet-propelled airplanes, depend upon surrounding air for oxygen. The rocket motor is the only type that can be employed in high altitude flight where the air is thin or nonexistent.

Liquid hydrogen is ordinary hydrogen gas converted to a liquid by cooling it below its boiling point, which is a minus 423 degrees Fahrenheit, he explained. It looks like water but is only one-twelfth as heavy. It is completely non-combustible and non-explosive by itself but burns with intense heat in contact with liquid oxygen. The temperature in the combustion chamber of the motor may reach 6,000 degrees Fahrenheit, many hundreds of degrees above the melting point of the nozzle and of the chamber walls.

The exhaust from a liquid hydrogen-liquid oxygen rocket can obtain a speed in excess of 8,000 miles an hour, which is 50% greater than that obtainable by the use of alcohol as a fuel, as in the German V2 used to bomb London during the latter part of the war.

However, he added, it is possible to impart even greater speed to the rocket since

it can be shown that the rocket obtains a speed higher than its exhaust when the weight of the propellant used for the rocket exceeds about 65% of the gross weight before takeoff. With a 90% propellant load the rocket can be accelerated to double the speed of the exhaust and with a 96% propellant load it can move at three times the exhaust speed.

In discussing the best fuels, he stated, "The maximum exhaust velocities will be provided by those propellant combinations that produce the most heat in burning and, at the same time, form the lightest gases in the combustion products. On both these counts the combination of liquid hydrogen and liquid oxygen ranks near the top."

Science News Letter, July 23, 1949

AERONAUTICS

Two Types of Jet Engines Power Flying Wing Bombers

See Front Cover

➤ BOTH turbojet and turbo-prop engines will be used for power in a new version of the Air Force's giant Flying Wing bomber, a product of Northrop Aircraft, Inc., Hawthorne, Calif., at whose plant the 100-ton piston-engined B-35 bombers are being converted to more modern propulsion.

Turbojets are the type of engines used in the ordinary jet-propulsion. The turbo-prop utilizes a somewhat similar gas turbine but the high-pressure gases formed are directed against vanes or buckets on a shaft, causing rapid revolution of the shaft which in turn operates conventional propellers.

The turbo-prop to be used is a product of Turbodyne Corporation, also located there, and it is said to be the world's most powerful aircraft engine. This new engine, until now unrevealed, has undergone an arduous testing program at the corporation's test cell and has now advanced to the flight test stage.

Three new versions of the Flying Wing will result from this modification program. Most unusual of the new versions will be a six-jet Flying Wing which will serve as a flying test bed for the new powerful Turbodyne engine. This airplane, designated the EB-35-B, in its first phase tests will be powered by six turbojet engines with the test Turbodyne mounted slightly to the left of the center of the plane, delivering its power through a large dual-rotation propeller.

All of the converted planes will be powered by new, improved Allison J-35 turbojet engines. The basic powerplant arrangement provides for four engines to be submerged in the wing in dual bays, and for two to be suspended in individual streamlined pods, as shown in the artist's conception on this week's cover of the SCIENCE NEWS LETTER.

Science News Letter, July 23, 1949

RESOURCES

Water Use Increasing

➤ MUCH talk on water resources of the world is scheduled for the UNSCCUR meeting to be held at Lake Success, N Y, in August, it was revealed. Threatened shortages due to increasing uses are beginning to create widespread interest in the best procedures for conservation and use. At least a score of papers on various phases of the subject will be presented by outstanding authorities.

The phenomenal increase in the use of water in the city, on the farm, and by industry has been an impelling force in accelerating the inventory and appraisal of water resources in the United States. C G Paulsen of the U S Geological Survey will tell this international group whose full name is the United Nations Scientific Conference on the Conservation and Utilization of Resources.

Fortunately, in large parts of the earth the supplies of fresh water are comparatively plentiful. However, in many places the development of our industrial and social economy has created water demands of a magnitude and variety that have exceeded all previous ideas or expectations, he will state. Consequently, supplies which have until recently been considered as essentially

inexhaustible are now recognized to have limits which, either immediately or prospectively, fix the extent of development.

In developing a program for a region, such as a river basin, adequate knowledge of the occurrence and characteristics of the available water resources is a prerequisite to wise planning and successful operations. It is pertinent to the development of the resources of the region no less than is the adequate coverage of the area by suitable maps and by knowledge of the geologic formations and conditions which affect both surface water runoff and ground water movement and storage.

Increased activities in fundamental water investigations will be urged by Mr Paulsen. They would be concerned not only with water supplies but with the fluctuations in the supplies. In water investigations there is a need to recognize the importance of every phase of the hydrologic cycle, he will state. This cycle is the system of never-ending circulation of water by movement through streams and underground formations, by evaporation and transpiration from the earth to the atmosphere, and its return as rain or snow.

Science News Letter, July 23, 1949

AERONAUTICS-METEOROLOGY

Plane Time-Saving Routes

➤ THE fastest airplane time between two points is not always by way of the shortest route, Kenneth J Arrow, of the Air Weather Service in Washington, points out in the JOURNAL OF METEOROLOGY (April). Faster time is made by taking advantage of strong tail winds and the weaker head winds.

Between air terminals the short route follows a great circle, an imaginary line between the points which if continued around the globe would cut its surface in two halves. In short flights, the deviation from the great-circle route can not be very large, so that no great advantage can be obtained, except in unusual conditions. In longer flight, some 1,000 miles or more, deviation from the great-circle route may save considerable flight time.

With the steady increase in the effective range of modern planes, the possibilities and importance of saving time by suitable choice of the route grow, he states. While the principles involved are universally accepted, little attention has been paid to the determination of the exact route which can be flown in the minimum length of time. In the past few years, the development of the radio altimeter has stimulated discussion of determining the geostrophic wind from an airplane flight. Geostrophic winds are those whose directions are determined by

deflective forces which are caused by the rotation of the earth.

The solution of this problem, he continues, has led to a method of determining a single heading such that an airplane starting from a given origin with that heading will, without change of heading, reach a desired destination. A single-heading flight has obvious advantages from the standpoint of the pilot.

The particular problem, which Mr Arrow discusses, is that of determining which, among the various steerable routes available, will require the least amount of time. Much mathematics are involved. Earlier work is quoted by the writer. The solution takes the form of a differential equation, understandable to the modern navigator, which the plane's heading is to satisfy.

Science News Letter, July 23, 1949

GENERAL SCIENCE

Language, Poisonous Fish Included in SIM Program

➤ STUDIES ranging from language to poison fish will be made in the Trust Territory of the Pacific by a team of six American scientists.

Dr I Dyen of Yale University will do

research on the language spoken on the island of Yap as a part of a new program called SIM, scientific investigations in Micronesia.

Poisonous fish in the Palau will be the subject of studies by Miss Eugenie Clark of the American Museum of Natural History.

Other SIM scientists are Dr Robert K Enders of Swarthmore College, who will seek scientific data on rat control on the islands, Dr M W de Laubenfels, University of Hawaii, who will conduct a sponge survey of several islands, Sidney Glassman of the University of Oklahoma who will make a botanical survey of Ponape island, and Irwin Lane of the University of Hawaii, who will make a botanical survey in the Palau, Mrs Ann Meredith of Radcliffe College, who will carry out research in social anthropology in the Truk area.

Ecological research for the Army Quartermaster Corps will be carried out by Dr R R Frosberg of Catholic University, assisted by Donald Anderson, botanist of Honolulu. They will leave for the Trust Territory in September.

Science News Letter, July 23, 1949

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National Flowers

➤ **GOLDENROD** is coming into bloom over many miles of prairie and in millions of fencerow thickets, its bright sprays will return greetings to the sky until first frosts signal the sun's retreat for another season. Sturdy, tough-stemmed, able to take care of itself in any kind of situation, it is a typically American plant.

So American is the goldenrod that many

people advance its claim to honors as the American national flower—a spot in the world's official flora that has not yet been filled. There is some reason in this claim. It belongs to a highly developed, widely adapted genus, its four-score or so species are found practically altogether on the North American continent, with only a couple of outliers in the Old World. Symbolically it would be a good choice as a member of the composite family, in which many small flowers combine to form one federated bloom, it typifies very neatly the American national motto, "E Pluribus Unum."

Principal contender against the goldenrod, and as stoutly supported by its advocates, is the columbine. This lovely flower also has its unique symbolism, for its common name is an appeal to the dove of peace, whereas its botanical title, *Aquilegia*, is supposed to be an eagle-reference, inspired, perhaps, by the resemblance of its flower

spurs to the talon of our national emblem.

Goldenrod and columbine suffer from opposite but equal handicaps in their flowering time. The best-known of our several native columbine species, found in practically all Eastern and Midwestern woodlands, is out of bloom by July 4, except in the extreme northern part of this country. On the other hand, no goldenrod is showing its gold until several weeks after Independence Day. So neither of the two contenders is able to be present at the celebration of the nation's birthday.

Goldenrod is further handicapped by the widespread though erroneous belief that it is a prime cause of hay fever. Actually, almost no hay-fever cases can be traced to its pollen. However, its conspicuous blossoms reach their fullest development just when the ragweeds, the real hay-fever villains, are shedding their pollen. So the innocent goldenrod gets the blame.

Science News Letter, July 23, 1949

ENTOMOLOGY

Insects Destroy Wood

➤ **THE** modern army sometimes has to fight a human foe but it has to carry on a continuous fight against the insects that destroy wood in structures and in all sorts of military equipment. This was indicated by W. D. Reed of the Army Corps of Engineers and T. E. Snyder of the U. S. Department of Agriculture at a national symposium on wood held in Washington.

The symposium was sponsored by the National Research Council and the Office of Naval Research, and was attended by national experts on wood and its uses from the leading research laboratories of the country. At the same meeting, wood-rotting fungi were discussed by Marshall W. Jennings and Richard Henderson of Syracuse University.

The lowering of the quality and grade of wood due to holes and staining, together with the actual loss of material eaten by borers, is caused primarily by two types of insects, one requiring wet and the other dry wood. Messrs. Reed and Snyder stated. In some cases the injury is caused by adult beetles which fly to the log or lumber and bore directly into the wood. In other cases, damage is caused by young larvae hatching from eggs laid under the bark or in the wood.

Particular attention was devoted to ambrosia beetles, or pinhole borers, that attack green wood, and to termites that attack both green and dry wood. Controls against both were discussed. Marine borers also came in for consideration.

The wood rots, of which some 2,000 species are known, are fungi of the class Basidiomycetes, the meeting was told by the Syracuse University bacteriologists. These rots typically grow on woody materials, living or dead trees, structural timbers, or woody decomposing deposits in

nature. These organisms are the chief fungi that can attack the cellulose-lignin complex which is characteristic of wood.

The undesirable activities of these fungi are their destructive effects on structural timber. However, the very fact that in the degradation of cellulosic materials they form new chemical compounds suggests the possibility that their activities can be turned into economically-useful channels.

Science News Letter, July 23, 1949

Words in Science— WEIGHT-MASS

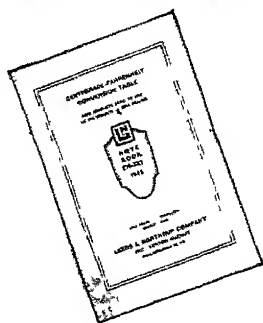
➤ **MASS** is not the same thing as weight.

Weight can, however, be used as a measure of mass, because weight is proportional to mass. The weight of an object is a force. It depends on the attraction with which the earth pulls on it. This attraction (gravity), and hence the weight of the object, changes with distance from the center of the earth and also as the object is moved about on the surface of the earth. You would weigh more at the North Pole than at the Equator.

Mass is a quantity, not a force. The unit of mass is not a pound, but a geepound or slug, which corresponds approximately to the mass of matter which weighs 32.2 pounds at sea level.

Weight is measured by a spring balance which measures the force required to stretch the spring. Such a scale would show less weight for the same objects at sea level and at the top of a high mountain. A balance scale, on the other hand, measures mass. No matter where it is located, the reading is the same for the same object.

Science News Letter, July 23, 1949



Quick-Reading

Temperature-Conversion Tables

For speed, when you're converting degrees F to C, and vice versa, you can now use a simple, compact "Sauveur-type" table all the way from absolute zero to 3350 C and 6062 F, in increments of one degree.

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July 23, 1949

Books of the Week

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ADAPTING WAR SURPLUS TO EDUCATIONAL USE—Robert E. Iffert—35 p., illus., paper, limited number of copies free upon request to Veterans Educational Facilities Program, *Office of Education*, Washington 25, D. C. Helpful hints on how to convert items of war surplus for use in the laboratory or on the campus. Food mixing machines, for example, can be used in cement work.

AMERICAN EDUCATION AND INTERNATIONAL TENSIONS—Educational Policies Commission—*National Education Association of the United States and American Association of School Administrators*, 54 p., paper, 25 cents. Recommending among other things that members of the Communist Party should not be employed as teachers.

THE BEE HUNTER—George Harold Edgell—*Harvard University Press*, 49 p., illus., \$2.50. A book for nature lovers giving clear and practical instructions for finding a bee tree and the delicious reward of wild honey. Written by an enthusiast who has pursued this hobby for 50 years.

BUTADIENE FROM ETHYL ALCOHOL—Study of the Variables of Operation—B. B. Corson, E. E. Stahly, H. E. Jones and H. D. Bishop—*Mellon Institute*, 6 p., illus., paper, free upon request to publisher, University of Pittsburgh, Pittsburgh 13, Pa. In 1944 more than 700,000,000 pounds of butadiene was produced from ethyl alcohol.

DESCRIPTION OF A RELAY CALCULATOR—Staff, Computation Laboratory—*Harvard University Press*, 366 p., illus., \$8.00. Detailed, technical description of the "automatic brain" formerly known as Mark II now in operation at the Naval Proving Ground, Dahlgren, Va.

EXPERIMENTAL PHYSICS FOR COLLEGES—Walter A. Schneider and Lloyd B. Ham—*Macmillan*, rev. ed., 442 p., illus., \$3.80. The majority of the experiments are designed to be worked by the whole class, working in pairs.

EXPLORER OF THE HUMAN BRAIN—The Life of Santiago Ramon y Cajal (1852-1934)—

Dorothy F. Cannon—*Schuman*, 303 p., illus., \$4.00. This interesting biography of a great histologist is prefaced by a memoir of Dr. Cajal by Sir Charles Sherrington.

FISHERY STATISTICS OF THE UNITED STATES 1945—A. W. Anderson and E. A. Power—*Govt. Printing Office*, 372 p., illus., paper, \$1.50. Data on the catch by place and kind of fish. The pictorial section would be useful in identifying the catch of an amateur.

INTERNAL-COMBUSTION ENGINES—Power Test Codes 1949—*American Society of Mechanical Engineers*, 50 p., paper, \$1.50. The code as now issued is entirely new.

THE NEW YORK ACADEMY OF MEDICINE—Its First Hundred Years—Philip Van Ingen—*Columbia University Press*, 573 p., illus., \$10.00. A Fellow of the Academy and member of the library committee writes a learned history of the organization.

THE STORY OF MAPS—Lloyd A. Brown—*Little, Brown*, 397 p., illus., \$7.50. The history of maps, the men who made them, and the methods they employed.

THE SUPERSENSITIVITY OF DENERVATED STRUCTURES—A Law of Denervation—Walter B. Cannon and Arturo Rosenblueth—*Macmillan*, 245 p., illus., \$5.50. Report of researches planned and begun by the late Dr. Cannon, continued by him in collaboration with Dr. Rosenblueth and finished by Dr. Rosenblueth who also completed the monograph.

THE TASK OF NATIONS—Herbert V. Evatt—*Duell*, 279 p., \$3.00. The Australian statesman, president of the General Assembly of the United Nations writes about some of the vital problems faced by that organization. An appendix includes the charter of UN.

THE TERPENES, VOLUME I, The Simpler Acyclic and Monocyclic Terpenes and Their Derivatives—J. L. Simonsen—*Cambridge University Press*, 2d ed., 479 p., \$8.50. A book for chemists on those terpenes which occur in nature.

Science News Letter, July 23, 1949

the thrombin in a solution containing phosphate.

The doctors reporting these methods are Drs. Byrne M. Daly, Elwood A. Sharp, Walter H. Seegers and Thomas B. Patton of Wayne University College of Medicine.

The thrombin method controlled bleeding in 114 of 140 patients. In 14 cases, the bleeding stopped but then started up again. These had to have another thrombin treatment. Some had to have operations as well.

Science News Letter, July 23, 1949

VETERINARY MEDICINE

Veterinary Case Histories Of Diseases Indexed

➤ "CASE histories" of diseases in animals, similar to those long familiar in human medical practice, are now being assembled and indexed, Dr. William H. Feldman of the Army Institute of Pathology reported to the American Veterinary Medical Association meeting in Detroit. Among the 5,964 cases already indexed, there are 2,046 on dogs, 190 on cats, 991 on horses and 567 on cattle. There are even classes for birds, reptiles and fish. Veterinarians all over the country contribute information to the register, and in turn draw upon it for aid in study of difficult cases coming under their own observation.

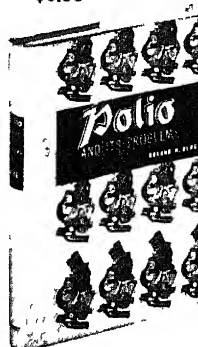
Science News Letter, July 23, 1949

The Biography of a Disease POLIO

and its Problems
by Roland H. Berg

The dramatic cavalcade of tireless research, perilous experiment and stern persistence as science answers the challenge of infantile paralysis. Here is a tribute to those who fight against the disease—a record of the steps taken—a report of progress in treatment.

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MEDICINE

Check Stomach Bleeding

➤ NEW WAYS to stop bleeding from the stomach and upper digestive tract were announced to the American Medical Association in Atlantic City. In one, a double balloon arrangement is put down the patient's esophagus, or gullet, till the lower balloon reaches the upper part of the stomach.

This balloon treatment was devised by four Detroit doctors to stop bleeding from ruptured veins in the esophagus, a condition called esophageal varices, which may end fatally.

Inflating the balloons just the right amount stops the bleeding by pressure. The method succeeded in 18 of 20 patients. Of

the failures, one turned out to have had an ulcer lower in the digestive tract and the other was in the last stages of cirrhosis of the liver. In the last case, the balloons had not been checked and became deflated.

The second method for stopping bleeding in cases of stomach ulcer and cancers consists in using the blood chemical, thrombin, to make the blood clot at the bleeding point and thus stop the hemorrhage. The trick in this method is to protect the thrombin from the stomach acid which makes it ineffective. This is done by washing out the patient's stomach first with a phosphate solution and dissolving

• New Machines and Gadgets •

For addresses where you can get more information on the new things described here, send a three cent stamp to SCIENCE NEWS LETTER 1719 N St. Washington 6, D C and ask for Gadget Bulletin 475 To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription

⚙️ **ROLLING PIN**, a non-traditional type, actually is a combination of eight small parallel rollers in a circular frame with a grasping handle above. The multi-roller, made entirely of a non-porous plastic, flattens dough to a uniform thickness and without the wavy conformation produced by the single roller.

Science News Letter, July 23, 1949

⚙️ **SPARK PLUG** for motor boats, designed to eliminate engine-induced interference with radio-telephone sets, has a built-in 10,000-ohm carbon resistor which, in effect, cancels out the lingering spark impulses that make miniature radio transmitters of the ordinary plug. Then cost is low.

Science News Letter, July 23, 1949

⚙️ **FLOOR LAMP**, with an adjustable standard, can be raised or lowered to any height desired. This recently patented device is a telescoping type, with the upright in three or more sections made to slide one within another and held in place by means of a special clamping mechanism.

Science News Letter, July 23, 1949

⚙️ **PINKING SHEARS**, shown in the pic-



ture, have plastic handles that make the tool light and easy to manipulate. The handles are molded to fit the curvature of the hand, and have enough flexibility to adjust to individual hand and arm pressure. Blades are hardened steel with a durable chrome-satin finish.

Science News Letter, July 23, 1949

⚙️ **SAFETY HANDLE** for automobile doors, to prevent children from accidentally opening a door while the car is in motion, is a replacement handle, easily installed, which is disengaged from the door lock by the turn of a key. The door can be opened from the outside at all times as originally made to operate.

Science News Letter, July 23, 1949

⚙️ **REVERSIBLE WRIST** watch, which can be turned dial face inward to protect it from injury at a workbench, for instance, is slid along a metal frame and flipped over, leaving its steel back facing upward. This Swiss product is a rectangular watch with a strong leather or metal wrist band.

Science News Letter, July 23, 1949

⚙️ **COLOR FILM** for the professional motion picture industry is an entirely new, synthetic polymer which is also a color former. It is a product which takes the place of both the gelatin binder and the color former heretofore used, providing results in excellent color reproduction and improved image.

Science News Letter, July 23, 1949

Do You Know?

Palladium, sister of platinum, is increasingly used in jewelry.

A crane equipped with a modern 29-inch round electromagnet can lift five tons.

Some half a million *fish-hooks* are made a day in the United States; amateur fishermen buy 50% of them.

Even the *birds* that feed extensively on seeds most of the year feed largely on insects during the spring.

Platinum has been known to the scientific world only about 200 years, while gold has been in use some 6,000 years.

The 1948 world production of *non-ferrous metals* was 268% greater than in prewar days.

Standard weights most generally used are made of brass, platinum and aluminum are often used for weights of one gram or less.

The present year marks the 400th anniversary of *Bahia, Brazil*, a Portuguese settlement 16 years older than the St. Augustine settlement in Florida.

The *population* of the world has doubled in the past century, according to the best estimates available, in 1850 it was some 1,091,000,000, it is thought.

The North Atlantic 1949 *iceberg* season, which ended June 15, was the mildest and shortest in recent years, in other years it has continued as late as August.

One of the world's best *cows* is a 16-year old Holstein at the Pennsylvania State College which has produced 236,325 pounds of milk containing 7,466 pounds of butterfat up to about April 1, 1949.

Some of the so-called *carnivorous plants* that trap and digest insects are so independent of the normal sources of nitrates that they are able to live in extremely poor soil.

Non-broadcast *television* service will probably do many jobs in the near future including the guarding of asylum and prison corridors and making it possible to watch chemical or radioactivity action from a protected position.

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THE WEEKLY SUMMARY OF CURRENT SCIENCE



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RCA Laboratories developed a copper mesh with 2,250,000 tiny openings to the square inch for the television camera "eye"



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it, like most major developments in all-electronic television, is another RCA Laboratories first. Leadership in science and engineering adds *value beyond price* to any product or service of RCA and RCA Victor.

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MEDICINE

Cancer Treatment Test

The ratio of the amount of two chemicals in the blood reveals the effectiveness of a cancer treatment and also shows the progress that cancer patients make.

➤ A BLOOD test that will tell within 24 hours whether a new cancer treatment is going to be effective or not has been developed by Dr P M West and Jessamine Hilliard of the University of California at Los Angeles Medical School in cooperation with the Birmingham Veterans Administration Hospital

A second feature of the test, its ability to show the progress of individual cancer patients, has already led to its being adopted as a standard procedure at the Birmingham Hospital. Any change in the patient's condition, whether accelerated spread of the cancer or sudden development of resistance, is promptly detected by the method.

The test involves charting the ratio of the amount of two chemicals in the blood. The chemicals are enzyme inhibitors, so-called because they slow down the action of enzymes. Familiar example of an enzyme is pepsin which helps digestion of food in the stomach. The many other enzymes of the body play equally important parts in body chemical processes.

The enzymes concerned in the cancer treatment test are rennin and chymotrypsin.

The concentration of the chymotrypsin slow-downer, or inhibitor, is directly related to tumor growth, while the concentration of the rennin inhibitor reflects the resistance of the patient.

When cancer treatment is effective, the

concentration of the rennin inhibitor is elevated well above that of the chymotrypsin inhibitor. When the treatment is not effective and the patient is failing, the chymotrypsin inhibitor rises sharply and the rennin inhibitor drops to a low level.

Unusual growth, such as occurs not only in cancer but in post-surgical cases, pregnancy and many infections, also affects the two inhibitors. The test, therefore, is never interpreted in terms of tumor growth unless interfering complications are absent. The test is not for cancer itself, and is not used unless a diagnosis of cancer has been made by the usual methods.

Science News Letter, July 30, 1949

AERONAUTICS

Suction Slots Reduce Drag

➤ AMERICAN planes of the Flying-Wing type may soon have long slots extending along the wing surface through which air will be sucked into the plane from the outer layer close to the surface, the so-called boundary layer which causes heavy drag. Research looking forward to use of such slots is well along by engineers of Northrop Aircraft, Inc., Hawthorne, Calif., makers of the present Flying Wings.

Scientists describe the boundary layer as the blanket of air made up of paper-thin layers which slide over each other immediately adjacent to the surface of an airplane in flight. This air envelope de-

velops miniature eddies and turbulences, which claw at the surface of the airplane, creating a large part of the drag which holds the plane back.

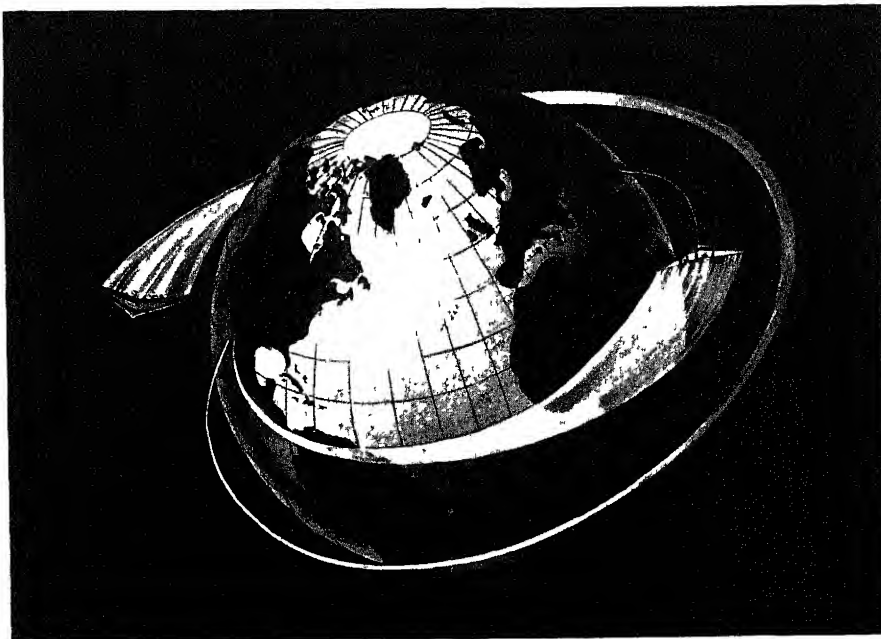
The idea behind the use of slots on the wings to remove part of the boundary layer and thus decrease drag is not new. The British, late in 1947, announced a twin-jet flying wing type of plane already at that time making flight tests which had a slot running spanwise across a large part of the wing through which boundary layer air was sucked.

The National Advisory Committee for Aeronautics, in its laboratories and wind tunnels at Langley Field, Va., has carried out considerable research on the slotted wing and has already issued a report indicating its belief that the method offers substantial improvement on thick, high-lift wings. The research is directed toward the reduction of drag in the relatively thin-section wings characteristic of modern, high-speed airplanes to extend their range.

Northrop's research program is directed toward controlling the boundary layer by means of narrow slots arranged in ranks. A pump in the airplane creates suction in the slots, whisking off the boundary layer air into the plane itself, and exhausting it behind. By continually drawing off the lower boundary layer air the heavy "build up" which leads to drag-inducing turbulence is avoided, and the atmospheric blanket which surrounds the airplane remains thin and smooth.

With the use of slots on the wings of planes of the Flying Wing type, decreased drag will save much fuel and give the aircraft far greater range. Northrop states that its engineers think that a Flying Wing so equipped could be operated on one-fourth the power required for a similar airplane not so equipped. These engineers estimate that the B-49 Flying Wing, with boundary layer control, could make a non-stop flight, without refueling, around the earth at the equator.

Science News Letter, July 30, 1949



ROUND-THE-WORLD RANGE—Flying Wings equipped with boundary layer control which reduces drag would be capable of flying non-stop around the globe, returning to the take-off point without refueling. This drawing illustrates the possible increase in range with this device although Flying Wings incorporating this device are not being built at present.

PSYCHOLOGY

Confirm Opposites Attract

➤ IN picking a wife or a husband, the old saying that "Opposites attract," holds good. This is confirmed in a study of 271 couples by Dr. Horace Gray, of the Stanford University School of Medicine.

Each husband and wife was classified according to Jung's psychological types. A person's interests may be turned inward toward the world of his own thoughts and feelings, or he may be interested primarily in other people and in things. His way of perceiving things may be by his faculties of sensation or by intuition. His judgments may be based on thinking or on feeling.

In only 40 couples, 15% of the group studied, were husband and wife alike in all three respects. In another 15% they were straight opposites—different in all three respects.

Most common picture was that of the extravert-sensation-thinking husband married to an extravert-sensation-feeling wife. Couples that are alike in two respects and complementary in one make up 38% of the group.

The attraction is greatest in the field of attitude, i.e., between introverts and extraverts, 61% were opposite in this regard. Next the mutual allure between marriage partners was greatest in the aspect of judgment, 59% were opposite in that one was of the thinking type and the other feeling. The pull of opposites in the field of perception, that is, between sensation and intuition types was lowest, affecting only 52%.

Intuition, despite the popular idea that it facilitates human understanding, may actually be a handicap to getting and staying married, Dr. Gray found.

Single people, he observed, are more often intuitive than are married people. And divorced people are more often of the

intuitive type than are the married or the widowed.

Dr. Gray warns against condemning any particular type. Each type has its usefulness, he says, and each has its limitations. Intelligence has nothing to do with any type. And neither has emotion, there is little evidence to support the common notion among feeling-type people that their emotions and humanity are somehow more sensitive than in thinking-type people.

Details of Dr. Gray's study are reported in the *JOURNAL OF SOCIAL PSYCHOLOGY* (May) Science News Letter, July 30, 1949.

GEOLOGY

Commercial Lode Tin Not Found in Alaska

➤ THERE is tin in Alaska, probably not much, but enough to warrant a government survey. A report on it is now available. No lode tin of commercial grade was found in the district investigated, but an appreciable amount of placer tin still remains in the Potato mountain tin placer district, the report states.

This district is near the tip of Seward peninsula and is just across the Bering strait from Siberia. It produced some 1,500 tons of tin concentrates in the first two decades of the present century, but none since. It is one of the few places on the North American continent where tin has ever been mined commercially. The United States is dependent on foreign countries for this vastly important and widely used strategic and industrial metal, supplies coming principally from Bolivia and the Far East.

The investigation and report are work of the U. S. Bureau of Mines. Copies of

the findings are available without cost from the Bureau of Mines, 4800 Forbes St., Pittsburgh. The title is *INVESTIGATION OF POTATO MOUNTAIN TIN PLACER DEPOSIT, SEWARD PENINSULA, NORTHWESTERN ALASKA*.

Science News Letter, July 30, 1949

RADIO

Saturday, August 6, 3:15 p. m., EDT

"Adventures in Science" with Watson Davis, director of Science Service, over Columbia Broadcasting System.

Dr. J. E. Hobson, director of Stanford Research Institute, Palo Alto, Calif., will talk about "Food from Algae."

Science News Letter, July 30, 1949

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PSYCHOLOGY

Claim We Are Misled

Lack of love and understanding toward others in world leaders is attacked by a scientist who sees humanity doomed unless new human values are adopted.

➤ THE world's leaders are misleading us. So declared Dr. M. F. Ashley Montagu, physical anthropologist of Hahnemann Medical College and Hospital, Philadelphia, Pa.

"Our world at the present time," he says in a report to the *JOURNAL OF SOCIAL PSYCHOLOGY* (May), "is largely directed by criminally irresponsible adventurers and cynical and complacent men who have grown old in the ways of self-interest and ultranationalism. Unless their place is taken by men of understanding and humility whose guiding principle is love, the world of man is doomed."

"Men who do not love one another are sick," declared Dr. Montagu.

"They are sick," he explains, "not from any sickness arising within themselves, but from a sickness which the malorganization of their societies has thrust upon them."

The belief in false values, in competition instead of cooperation, in class and race and national prejudice instead of love, in narrow selfish interests instead of altruism, in atomism (especially atom-bombism) instead of universalism, in the value of the dollar instead of the value of man, represents social man turning upon all that is biologically good in him.

Love and cooperation among men as natural states have a support in the findings of biological sciences, Dr. Montagu shows.

Cooperation is essential to survival, he declares.

The habit of thinking of evolution in terms of the struggle for existence in which the fittest are alone selected for survival while the weakest are ruthlessly condemned to extinction is not only an incorrect view of the facts, but is a habit of thought which has done a considerable amount of harm, Dr. Montagu says.

Certainly, aggressiveness does exist in nature, he explains, but there is also a healthy non-ruthless competition, and there do exist strong drives towards social and cooperative behavior. These forces do not operate independently but together, as a whole, and the evidence strongly indicates that of all these drives the principle of cooperation is the most dominant, and biologically the most important.

Even planarian worms, Dr. Montagu has found, help each other to survive damaging ultraviolet rays when they are together.

Man, Dr. Montagu says, has no need to create a cooperative mood for himself by denying his savage strivings to be otherwise. The impulses toward cooperative behavior are already present at birth and need only to be cultivated.

"The infant of most vertebrates is equipped with the ability to compete with the universe for attention, and it generally succeeds in eliciting cooperative behavior, usually from one or both parents."

Dependency begins before birth, Dr. Montagu points out.

"The reproductive process is a cooperative one, and in addition development as one of a litter or group of siblings represents another early experience in the development of cooperation, development within a family represents a still further experience in the learning and practice of cooperation."

As the child matures, the socializing process continues and he becomes more and more dependent, more and more bound to others.

"Man does not want to be independent," Dr. Montagu says, "to be free in the sense of functioning independently of the interests of his fellows, freely and detached. This kind of negative independence leads to lonesomeness, isolation, and fear."

"What man wants is that positive freedom which follows the pattern of his life as an infant within the family, dependent security, the feeling that one is part of a group, accepted, wanted, loved and loving."

Science News Letter, July 30, 1949

FORESTRY

Find Rival Tannin Source In Mexican Seed-Pod

➤ THE seed-pod of the cascote tree from nearby Mexico is a promising rival to the wood of the Argentine quebracho tree as a source of tannin for American leather, it was revealed by Armour Research Foundation of the Illinois Institute of Technology, which operates a research laboratory in Mexico City.

The Mexican product is also satisfactory for use in controlling the viscosity of the so-called muds used in drilling deep oil wells. Some 40% of the South American quebracho product imported to this country is used for this purpose. Pumped down the hollow shaft that carries the rotating drill, these muds lubricate the drill, and bring the cuttings to the surface through the space surrounding the drill shaft. Proper viscosity is essential, and to secure it an additive to the usual clay-water mixture is needed.

Cascote has long been used in Mexico in a crude form for leather tanning. The new development is a process that

yields a stable concentrated extract of tannin suitable for export. The cascote tree is plentiful in certain sections of Mexico, and only the seed-pod is used to obtain the tannin. Quebracho trees in South America are becoming less plentiful because the tree must be cut down to obtain its extract.

The United States imports of quebracho in recent years have been about 100,000 tons annually at a cost of about \$40,000,000 a year, according to Dr. Francis Godwin of the Foundation's staff. About 90% has come from Argentina, whose price control policies and recent Anglo-Argentine trade pact discussions have tended to make U. S.-Argentine trade more difficult.

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AERONAUTICS-ENGINEERING

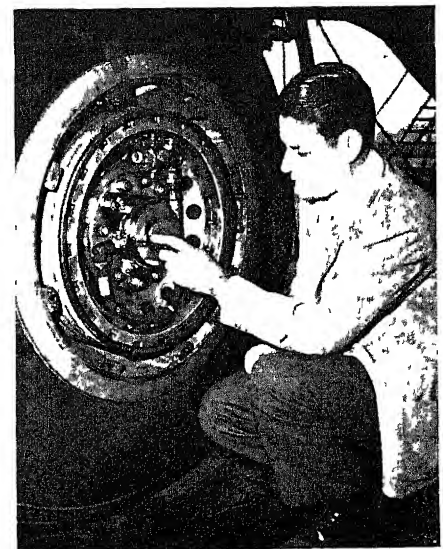
Non-Skid Brake Device Will Aid Plane Landings

➤ A NON-SKID brake device which will let planes land in a shorter space with greater safety has been announced by the Boeing Airplane Company in Seattle.

An automatic electronic valve system reduces the braking power when the speed of the wheels drops to almost the skidding point. By preventing skidding, the system brings the plane to a stop sooner. Added advantage claimed is a saving in tire wear.

Tests on the new system were made with truck-trailer, towed along plane runways at high speeds.

Science News Letter, July 30, 1949



ANTI-SKID-DEVICE—The centers of all four main wheels of the Strato-freighter are equipped with this automatic device which sets braking action to prevent skids from any cause. It weighs only three and one-half pounds.

MEDICINE

Blood Casts Aid Injured

➤ CASTS made of solid blood can repair severed nerve ends. The new blood casts were described to the Fourth International Congress on Otolaryngology in London by Dr. J. A. Sullivan of Toronto.

The casts are used on patients who have suffered wounds that cut their facial nerves or who have had tumors removed from a nerve.

The nerve stumps are sewn end to end,

with fine sutures, or stitches. Then the sutured ends are placed in a flexible mold and some of the patient's own liquid plasma is poured in. The blood solidifies in three to seven minutes, after which the mold is removed, leaving the severed nerve ends encased in a cast of solid plasma.

Dr. Sullivan reported that this method knits the nerve ends together most effectively.

Science News Letter, July 30, 1949

BOTANY

English Grow Poison Ivy

➤ THE English, it is generally admitted, are quite hardy. As gardeners, some of them would seem even foolhardy. For they grow poison ivy as an ornamental vine!

Not long ago, an American botanist, leafing through a prewar nurseryman's catalog from England, came upon this astonishing entry:

"*Rhus Toxicodendron* Linn. The American 'Poison Ivy', a loose, rambling shrub or climber; the sap contains an irritant poison. Although a wonderful piece of brilliant autumn colour it should not be planted where likely to be handled."

The startled botanist set off a chain of inquiry which wound up at the London headquarters of the Royal Horticultural Society. The response:

"As far as they are aware the plant is still permitted to be sold freely here. It is essentially grown by the plant connoisseur, who cultivates it as an ornamental for its beautiful autumn foliage."

"The attitude here is that while some people are sensitive to its toxin, by no means all people are. It has never shown any tendency to become a weed here and is not found growing wild. There have been cases of *Rhus toxicodendron* dermatitis (ivy poisoning), but it is so rare here that the diagnosis is often missed until someone with special knowledge of the plant points it out."

"The beautifully coloured autumn leaves have even been used by horticulturalists to set off displays of their fruit at horticultural shows."

The very first Englishman to encounter poison ivy and write about it took an equally cool view of the plant. He was none other than the redoubtable Capt. John Smith, who met up with poison ivy during the early days of the Virginia colonization. For a man with his reputation as a first-class freehand exaggerator, Capt. John Smith gives an exceedingly conservative description:

"The poisonous weed, being in shape but little different from our English yvie;

but being touched causeth redness, itching, and lastly blysters, the which howsoever, after a while they passe away of themselves without further harme, yet because for the time they are somewhat painful, and in aspect dangerous, it hath gotten itself an ill name, although questionable of no very ill nature."

Yes, the English are a hardy race.

Science News Letter, July 30, 1949

VETERINARY MEDICINE

Quick Detection Possible For Chicken Tuberculosis

➤ A QUICK method for detecting tuberculosis in chickens was described by Drs. A. G. Karlson and W. H. Feldman of the Mayo Foundation and Dr. M. R. Zinober of the U. S. Bureau of Animal Industry to the American Veterinary Medical Association in Detroit. To a drop of the bird's blood a drop of a tuberculosis antigen is added. A cloudy precipitate indicates that the chicken is diseased; if the bird is healthy, the fluid remains clear. This test is more accurate than the older tuberculin test, the two researchers declared. It gave positive readings wherever the tuberculin test was positive, but also correctly indicated numbers of fowl to be tuberculous where the tuberculin test gave only negative results.

Science News Letter, July 30, 1949

ICHTHYOLOGY

Philippine Fish Killed by DDT Anti-Mosquito Spray

➤ YOUNG fish in shallow rearing ponds in the Philippines were killed in large numbers when the area was sprayed with DDT to control malaria mosquitoes, reports Dr. Earl S. Herald, curator of aquatic biology at the Steinhart Aquarium in Golden Gate Park.

The losses occurred in a big lot of young milkfish, a species of considerable economic importance in the Philippines,

The owner of the ponds tried to reduce the damage by increasing the depth of the water, nevertheless he lost about half of his entire stock. Because of his protests, no further spraying was done over his ponds.

Dr. Herald also notes that another Philippine fish known as snakehead or mudfish are often killed by anti-malarial DDT spraying. Some Filipinos capture and eat such poisoned fish, but thus far none of them has been reported as suffering any ill consequences.

As a matter of fact, human beings seem to be tougher than snakes in this respect, for numbers of water-dwelling serpents have been killed by eating DDT'd fish.

Dr. Herald made his studies while serving as a member of the Army Air Force Committee on Aerial Dispersal of Insecticides.

Science News Letter, July 30, 1949

AERONAUTICS

Large-Size Flying Boats Superior to Landplanes

➤ THE flying boat is superior to the landplane in large sizes, the Anglo-American joint aeronautical conference was told in New York by D. Keith-Lucas of Short Brothers and Harland, Ltd., England. The large flying-boat is superior in the three things that pertain to the overall efficiency of an air line: economics, safety and reliability, he stated.

The landplane is the more efficient only in the smaller sizes, he continued, and only if by efficiency is meant its aerodynamic and structural efficiency as a flying machine. The greater the size, the greater is the advantage of the flying boat, until, on economic grounds, particularly in connection with provision of airports, it becomes impossible for the landplane to compete.

He compared a flying boat and a landplane dynamically similar, powered by the same engine, having the same range and able to carry the same weight of payload. The flying boat is lighter than the landplane at weights greater than 100,000 pounds, he said, and faster at extremely high weights. But the landplane and the flying boat will have the same speed if they are large enough, this point of equal speed occurs somewhere between 250,000 and 500,000 pounds gross weight.

For practical purposes, the difference in performance between the flying boat and the landplane is extremely small at weights greater than about 250,000 pounds. The availability of bases and the distance to alternate landing places overshadow the flying efficiency. Future safety requirements will demand longer runways and alternate airports for landplanes, he declared, which can be provided only at an enormous capital expenditure that even military necessity might not justify.

Science News Letter, July 30, 1949

ASTRONOMY

Find New Sky Object

A minor planet or asteroid, which comes closer to the sun than any previously discovered, has been spotted at the new observatory at Mount Palomar.

➤ THE first great sky discovery made by the new observatory on Mount Palomar may help astronomers unravel the mystery of the origin of the solar system

Baade's object, a minor planet, or asteroid, discovered late last month by Dr. Walter Baade with the 48-inch Schmidt telescope at Palomar, may continue to be observed as it follows its unique path around the sun, latest computations indicate

The new asteroid comes closer to the sun than any previously discovered, approaching within 22,000,000 miles. Thus, its elongated, football-shaped orbit, or path, takes it within the orbit of the planet Mercury at its nearest approach to the sun, and out beyond the orbit of Mars at its greatest distance, 156,000,000 miles from the sun.

Believed to be only about nine-tenths of a mile in diameter, the new baby planet is now estimated to take only 343 days to complete one journey around the sun.

Drs. Robert S. Richardson and Seth B. Nicholson of the Palomar and Mount Wilson Observatories base their figures on five observations which have been made since Dr. Baade first found the new asteroid on photographic plates made June 26.

If astronomers can continue to keep track of it, the new discovery may give important data for studies of the solar system. Because of its path, it is expected to help astronomers determine the mass of the planet Mercury, which is still relatively uncertain.

The wide-eyed, 48-inch Schmidt telescope with which the new minor planet was discovered is the largest of its kind, though smaller than the more famous 200-inch 'scope on Palomar Mountain.

Too faint to be seen by the naked eye, the new asteroid is near the bright star, Antares.

At its closest approach to the sun, the new find is estimated to have a temperature as high as 1,000 degrees Fahrenheit, although the surface temperature is probably lower. But at its greatest distance from the sun, six months later, its surface is well below the freezing point of water.

It comes even closer to the earth than it does to the sun, 4,000,000 miles at its nearest approach. But this is much farther from the earth than an asteroid called Hermes, which once came within 485,000 miles of the earth.

Hermes disappeared, however, and was not observed again, so the new minor planet may be the closest one to us which astronomers can keep track of in its flight.

If it is, Dr. Baade will get credit for dis-

covery of both the closest and most distant asteroids to the earth which scientists have been able to compute orbits for. The Palomar astronomer, just 25 years ago in 1924, also discovered the minor planet, Hidalgo, most distant asteroid on record, which gets out to 900,000,000 miles from the sun.

Science News Letter, July 30, 1949

GENERAL SCIENCE

UNESCO Meeting Studies Work of Science Clubs

➤ CREATING and encouraging interest in science through club work was discussed at an international meeting of science club leaders held in Paris by the United Nations Educational, Scientific and Cultural Organization.

Watson Davis, director of Science Service, Washington, D. C., attended the meeting at which the work of Science Clubs of America, administered by Science Service, was studied.

Mr. Davis told the club leaders that Science Clubs of America now has 15,000 affiliated clubs in the United States and

other countries, with a third of a million boys and girls participating in the program. In addition to the year-round club activity, Science Clubs of America also conducts the annual Science Talent Search for the Westinghouse Science Scholarships.

Dr. Pierre Auger, director of the department of natural sciences of UNESCO, was chairman of the international meeting.

Science News Letter, July 30, 1949

PLANT PHYSIOLOGY

Micrograft Method Saves Weak Hybrid Plants

➤ MICROGRAFTING, an exceedingly delicate technique in plant surgery, is being used by Dr. A. F. Blakeslee of Smith College, Northampton, Mass., to save weak but valuable hybrid plants, useful in the broad program of research into the cause of cancer.

The tiny plants, so weak that they are not even able to break through the seed-coat and sprout in the normal manner, are carefully removed from the seeds and nourished for a time in test-tubes on special food mixtures. When they are about an eighth of an inch long they are grafted into the stems of vigorous plants related to them.

Each graft is covered with a "micro-greenhouse" consisting of a gelatine capsule, which has been coated with nail polish to keep it from softening when wet. This protects the seedling against drying until the graft "takes."

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SAVING WEAK PLANTS—Hybrid plants too weak to survive under their own power are grafted into the stems of related vigorous plants. Micrografting, as this delicate plant surgery is called, is the work of Dr. A. F. Blakeslee of Smith College, shown here.

ENTOMOLOGY

Red, White and Blue Eyes Help Trace Bees' Flight

► RED-, white- and blue-eyed bees are being bred at the California Agricultural Experiment Station in Davis, Calif. by artificial insemination methods. This is not a patriotic stunt, nor do the unusual eye colors have any particular value in themselves.

They are being used by Dr. H. H. Laidlaw as natural markers. Bees with qualities which he wishes to study, such as efficient flight patterns and long working lives, are having these colored eyes bred into their strains, so that they may be easily observed at work. Hitherto it has been necessary to mark individual bees with tiny spots of paint—a laborious and somewhat touchy job.

Science News Letter, July 30, 1949

ZOOLOGY

"Extinct" Elephant Seals Stage Comeback off Mexico

► ELEPHANT seals, once thought extinct, are staging a rapid comeback in Mexican offshore waters, and may some day re-occupy their old-time range off the southern California coast, states Dr. George A. Bartholomew of the University of California at Los Angeles.

Elephant seals are huge animals, as much as 20 feet long and attaining several tons in weight. They get their name from the peculiar proboscis-like snout.

In former times they were hunted for their oil, which is much like whale-oil. During the nineteenth century the hunt was pushed so hard that it was thought the species had become extinct.

However, a small number of survivors were discovered on the Guadalupe Islands off the coast of Lower California. This area was made a permanently closed sanctuary by the Mexican government. They have now multiplied to such an extent that a few have appeared on the Coronados islands off San Diego, and on the Channel islands farther northwest.

Science News Letter, July 30, 1949

GEOLOGY

Backward-Flowing River Forms Delta at Wrong End

► THE fabulous horse with its head where its tail ought to be has a counterpart in a short river in the State of Maine, which has a delta at its head instead of at its mouth. This curious phenomenon is described in the journal, *SCIENCE* (July 15), by Dr. C. N. Savage of Kent State University, Kent, O.

The stream, known as Dead River, normally drains water from Androscoggin Lake into the Androscoggin River. Its course, mainly northwesterly, is six or seven

miles long. It is very sluggish, since the usual difference in level between lake and river is only four or five feet.

However, during the time of spring freshets, the high-water level in the Androscoggin River becomes higher than the lake, and the current in the Dead River is reversed, so that it "flows backward" into the lake. At such times, the river water is heavy with rock silt, and this burden, dropped when the current of the Dead River enters the still water of the lake, is forming the delta.

The delta is now about one and one-half miles long and a quarter of a mile wide.

Science News Letter, July 30, 1949

PALEONTOLOGY

Insects in Baltic Amber Held Older Than Estimated

► ANTS and other insects embalmed in Baltic-region amber may have their ages revised upward quite radically. Hitherto they have been considered to be of Lower Oligocene date, some 8,000,000 or 9,000,000 years old.

Now, however, at least two outstanding scientists hold them to belong to the much earlier Lower Eocene, near the beginning of the Age of Mammals, and a good 55,000,000 or 60,000,000 years old. This new dating is agreed on by Dr. Frank M. Carpenter, Harvard University entomologist, and Dr. J. P. Marble, geologist of the U. S. National Museum.

Science News Letter, July 30, 1949

GENERAL SCIENCE

Science Teachers Urge Foundation Bill Passage

► THE Board of Directors of the National Science Teachers Association has urged passage of a bill to create a national science foundation.

A resolution adopted by the board supported the bill introduced by Rep. J. Percy Priest, D., Tenn., which is now before the Rules Committee of the House of Representatives. A similar measure passed the Senate in March.

Other resolutions adopted by the group condemned "all efforts to stop medical research, including the essential use of experimental animals."

Urged that science be made a part of the "core" curriculum in schools, with a science sequence of courses in the secondary schools based on full elementary school science programs.

Asked the Association to continue its studies of new and existing equipment and supplies and new techniques for science teaching.

Called for reemphasis of the "necessity for freedom of scientific research and for freedom of interchange of scientific thought."

Science News Letter, July 30, 1949



CHEMISTRY

Traces of Toxic Gases Found in Cigarette Smoke

► TESTS made with a mechanical chain smoker have revealed that cigarette smoke contains the toxic gases, carbon monoxide and acetylene—but in amounts too small to be dangerous.

The machine smoked 10 packs of cigarettes every eight hours, and John B. Fishel and J. F. Haskins of the Ohio State University Research Foundation in Columbus, O., made a chemical study of the smoke. They did not compare different brands.

Then findings in the 27 cubic inches of smoke given off by the average cigarette: there is 3% carbon monoxide, 77% carbon dioxide and bare traces of acetylene and hydrogen sulfide.

The chemists have reported their work in the magazine, *INDUSTRIAL AND ENGINEERING CHEMISTRY* (July).

Science News Letter, July 30, 1949

GENETICS

Polish Biologist Straddles Soviet and Western Views

► BIOLOGY in iron-curtained Poland is apparently endeavoring to steer a middle course between the new "orthodoxy" of the Mitchurin-Lysenko school in Russia and the kind of life science considered valid in the rest of the world. In a recent publication, Prof. Stanislaw Skowron of the Jagellonian University, Krakow, has this to say:

"Today the science of heredity can supply direct proof of the evolutionary processes. The gene is no more regarded as an abstract entity but has become localized in the nucleus of a cell as a concrete functional unit. Modern genetics has also taken into account the influence of environment, as every trait of the organism is the result of cooperation of all genes with the environmental conditions."

All this agrees very closely with the position of geneticists and biologists generally in the West. Prof. Skowron, however, makes a bow towards the East.

"A new light has now been thrown on the controversial problems of heredity of acquired traits by the investigations of Russian scientists who have discovered new methods of dealing with this basic problem. One should expect that in the near future it will be possible to combine the principles of orthodox genetics with these new discoveries."

Science News Letter, July 30, 1949

THE FIELDS

AERONAUTICS

Supersonic Air Jet Used in Airflow Studies

➤ A "WIND TUNNEL" that is not a tunnel is in use at the airplane division plant of the Curtiss-Wright Corporation, Columbus, O., for basic research in air flow phenomena. Its most important unit is a three-inch nozzle from which a 1,200-mile gale can be delivered.

Another unit is a calibration stand to measure the velocity of the air coming from the nozzle. Models of planes and missiles are attached to this stand and data relative to the effects of the air passing over them are obtained. The investigations made with this setup are similar to those made elsewhere with enclosed wind tunnels.

To obtain the highest speed of the supersonic jet, air is forced through the nozzle at 6,500 cubic feet a minute. The resulting blast will knock a man over if he gets in its path. Shock waves created by the terrific force of the air are clearly visible when the jet is operating, Curtiss-Wright officials state.

Science News Letter, July 30, 1949

RADIO

Wider Use of Television In Movies Foreseen

➤ WIDER use of theater television service is foreseen and the Federal Communications Commission has recently sent a letter to several organizations interested, inviting suggestions relative to the minimum frequency required, specific frequency bands desirable, and other information for use in issuing authorizations.

The Commission first opened the door for experimentation with radio relays for the development of theater television in 1945 in a general allocation hearing conducted near the end of the war. The Commission made available on a shared basis with other services the 475 to 920 megacycle band, as well as certain frequency bands in the 1,000 to 13,000 megacycle portion of the radio spectrum, and the bands 16,000 to 18,000 and 26,000 to 30,000 megacycles.

The first authorizations issued by the Commission for experimentation with radio relays for theater television purposes were granted on Nov. 18, 1947, to what is now Paramount Television Productions, Inc. This permission authorized on a temporary basis experimentation on frequency bands in the 2,000 to 7,000 megacycle regions in the area of New York City. Authorization was granted to Twentieth Century-Fox

Film Corporation late in 1948 for experimentation in the 2,000, the 7,000 and the 13,000 megacycle regions.

Two methods of television programs inside motion picture theaters are in use. In one the television program is projected directly to the theater screen. In the other, the television pictures are photographed on regular 35-millimeter film, and this film is used to throw pictures on the screen with the use of the regular motion picture projector.

Science News Letter, July 30, 1949

ARCHAEOLOGY

Indian Relics from D. C. Given to Smithsonian

➤ LONG before Washington was built on the banks of the Potomac, an Indian town of some 300 families occupied part of what is now the District of Columbia. Capt. John Smith visited this settlement in 1608, but subsequent history shows little of this particular tribe. The red men seem to have just faded away before the oncoming of the whites.

A large collection of arrowheads and other things used by inhabitants of this lost Indian town has just been presented to the Smithsonian Institution by Georgetown University. The artifacts were collected about 50 years ago by Dr. Louis A. Kengla, who picked most of them up in open fields that are now covered by city blocks.

Good stone for arrow-head purposes seems to have been lacking; the collection indicates. Local materials consisted mainly of brown quartzite and white quartz, which are hard and difficult to flake properly. The lost tribe therefore imported a softer stone, known as rhyolite, from what is now Pennsylvania.

Science News Letter, July 30, 1949

AERONAUTICS

Flashing Lights Suggested For Private Planes

➤ FLASHING position lights for all night-flying private airplanes, similar to those now required on transports, were recommended by the U. S. Civil Aeronautics Administration, but no immediate steps are proposed to make their installation compulsory.

Inexpensive versions of the blinking lights are now available, costing from \$4 to \$20, and weighing from three to 20 ounces. They require very little electric power. Transport planes long have used flashing position lights because they are distinctive in the air. Steady lights can easily be mistaken for stars, CAA officials state. With lights flashing from 72 to 120 times a minute, there is little possibility of such a mistake.

Science News Letter, July 30, 1949

TOPOGRAPHY

Aerial Photos Aid in Making Navigational Charts

See Front Cover

➤ ACCURATE maps for basic defense and for charts used in navigation are now being made by the U. S. Coast and Geodetic Survey from aerial photographs made from a U. S. Coast Guard airplane, as shown on this week's cover of the SCIENCE NEWS LETTER. The Coast Guard airplane, with special photographing equipment, is devoting some nine months each year to this work.

The plane used is a converted B-17, Flying Fortress of World War II fame. The camera is clamped to a special permanent mount installed in the plane. It is a nine-lens camera, said to be the only one of its kind in the world. The photographs are taken at a height of approximately 13,750 feet. Each photograph is 35 inches square and records a ground area of about 120 square miles.

The plane requires a crew of eight. The photographs are taken by two representatives of the Coast and Geodetic Survey. Included in areas to be covered are parts of Alaska and the Aleutian islands. Work in these areas must be done in a few weeks in summer because photos of snow-covered terrain are worthless in map-making.

Science News Letter, July 30, 1949

ICHTHYOLOGY

Anchovies and Death Found In South American Lake

➤ FOOD and death both lurk for humans in the strange waters of Venezuela's Lake Maracaibo, a scientist at the Smithsonian Institution reported.

Dr. Leonard P. Schultz, curator of fishes at the institution, studied the fish life in the lake which has both fresh and salt water. Northern end of Lake Maracaibo meets the Caribbean Sea, while the southern portion is fed by fresh-water rivers.

Anchovies, a herring-like fish best known from European waters, are in the lake in great quantities, Dr. Schultz found, apparently unexploited and virtually unknown to fishermen.

Worst menace of the lake's water is not the furly large sharks found there but a relative of the sharks, large sting rays.

Sting rays are flat and plate-shaped, with a long, sharp spine sticking out of the tail. The tail is so powerful that the spine of even a small ray can be driven completely through a person's foot. The spine is probably poisonous.

When wading in tropical waters, push your feet along the bottom instead of taking steps, Dr. Schultz advises. This way you won't step on a ray.

Science News Letter, July 30, 1949

ICHTHYOLOGY

Electronic Fish-Finder

This instrument spots for fishermen the location of fish, indicates about how many there are, their speed and direction of travel, and often their species.

By DON EDDY

► IN THE summer of 1947 the crews of 14 commercial seining boats out of southern California ports witnessed a demonstration of fishing magic. For days they had patrolled the fringes of an enormous bed of kelp near Cedros Island off the Mexican coast, waiting for schools of tuna to leave the kelp and return to the open sea. Until that happened they dared not set their nets, for kelp is a heavy, matted seaweed which forms writhing masses that can snarl and sink any seine.

Into this stalemate steamed another seiner—the Caesar Augusto commanded by Capt. Larry Zaunich. Customarily, Capt. Zaunich would have joined the waiting fleet, instead, he nosed his prow into the kelp bed. Before dark that day he was safely out with his nets intact—and 150,000 pounds of fresh tuna in his hold. In port, his bewildered colleagues bombarded him with one question: How did he do it?

"Easy!" grinned Capt. Zaunich. "I used a gadget that found holes in the kelp bed big enough for my seine, and even told me whether there were fish in the holes."

Finds Fish Unerringly

Then a curiosity, the gadget was a Bendix DR (Depth Recorder)—an electronic device which started as a navigational aid but has recently become the most exciting news in the commercial fishing industry. Enabling fishermen to "see" vast distances under water, it finds fish unerringly in sunshine, storm, fog, or darkest night.

The Bendix DR shows fishermen instantly and accurately where fish are, approximately how many there are, how fast and in what direction they are traveling, and in many cases what species.

Although only 2500 of the nation's 83,000 commercial fishing craft are equipped with fish-finders, the total catch of fish last year was 125,000,000 pounds greater than in 1946, when only a few finders were in use.

To watch the fish-finder at work, I stood in the wheelhouse of a 150-foot purse seiner off the Carolina Capes while Capt. Roy Goodwin tracked down menhaden, one of the most valuable of America's commercial fishes. Mounted on the bulkhead in front of the ship's helm was a box about the size of a portable radio. A scroll of paper moved slowly across the face of the box. The paper was lined vertically, representing the undersea area forward and

beneath the ship, numbered lines ran horizontally, indicating the depth. Thus the graph was in effect a map of the water for hundreds of feet, divided into sections each representing one minute's travel time of the vessel.

Across the face of the graph horizontally as the ship cruised along, styli were drawing two roughly parallel lines. The top line represented the surface of the ocean, the bottom one showed the jagged, irregular outline of the ocean floor below us. Between the top and bottom lines the styli were also drawing scores of odd-shaped doodles, sometimes singly but often in clusters. "Those are fish," said Capt. Goodwin, "singles and little schools." He watched the device until a big black doodle formed at a depth of about 40 feet and some 100 feet ahead. Ringing for reduced speed, he said, "That's a school of menhaden."

Schools of fish used to be spotted by lookouts until the advent of the fish-finder. Although the lookouts could not see far below the surface, especially in bad weather, Capt. Goodwin clung to tradition

by keeping three men in a crow's nest atop the mainmast. They had seen no fish and now reported they still could see none, although the huge school was clearly visible on the fish-finder's graph.

Maneuvering his boat to keep the fish just ahead without getting close enough to alarm them, Capt. Goodwin ordered the longboats away with the seine. By comparing the location of the fish with the longboats' position, he directed the men in them until the school was surrounded, the seine lowered and the purse-line drawn to close it at the bottom. Soon we watched 90,000 shimmering menhaden cascading into the hold, on their way to becoming vitamins, cosmetic oils, livestock feeds and fertilizers. "We'd have missed them entirely without this gadget," the captain said. On two successive weeks, previously he had caught 200,000 and 300,000 fish which no one saw until they were netted. "I reckon I've caught a million more fish with the Bendix DR this year than I would have caught without it," Goodwin told me.

Many Fishermen Doing Well

Other menhaden fishermen with whom I talked had done about as well. The two largest schools ever reported were located with fish-finders last summer. Said Joseph C. Jett, of Reedville, Va., a fleet owner who has equipped all his ships: "It's like



MENHADEN FLEET—This fishing fleet at Beaufort, N. C., lets the fish-finder do the work of locating their catch.



SCIENTIFIC FISHING—Capt. Roy Goodwin, skipper of a menhaden boat, watches the smudges on the graph which indicate to him where a school of fish can be found.

being down there in a diving suit, only better because there's practically no limit to the DR's visibility"

The fish-finder operates by sound waves. It has long been known that sound travels through water at approximately 4800 feet per second. The practical use of this knowledge, of course, seemed to be in measuring the depth of water, but little was done about it until, in 1912, the Titanic rammed an unseen iceberg and sank with a loss of 1517 lives

Underwater Echoes

Spurred by world-wide clamor for a device which would detect invisible navigational hazards, scientists in Europe and America hurriedly began to experiment with underwater echoes

In the United States, Prof. R. A. Fessenden developed a powerful oscillator to provide sound of great intensity in water and an instrument to convert the travel time of sound into measurement of distance. But sounds of audible pitch were too easily confused with such noises as breaking waves and churning propellers. Then, in France, scientists Langevin and Chilowsky developed an apparatus to project sounds of such high pitch that they were inaudible to the human ear but could be detected by special listening devices

Now the path for development was clearly marked. In 1918 the United States Navy installed its first echo-sounder. By 1925 echo-sounders had become available to commercial vessels to detect shoals and obstructions. Today, they are used as navigational aids all over the world

In operation, continuous streams of sounds are emitted from a device on the

bottom of the boat. The sounds travel in a widening cone like shotgun pellets and send back echoes when they strike solid objects. Capturing the echoes, the apparatus instantly computes the time elapsed since the discharge of the sound, translates this time into lineal distance, and figures the object's size, shape, and relative density. In some instruments (two others besides the Bendix are made in the United States, one in England and one in Canada) part of this information is conveyed to the mariner by flashing lights or buzzes, but the Bendix DR transfers all of it to a graph where it appears as a pen-and-ink record

From the earliest tests, experimenters were perplexed by mysterious interferences. Sometimes in deep water with no known obstruction within miles, the echoes bounced from objects which were fairly close to the ship, and apparently moving. Evidently these strange objects were fish, and it was only a step to the realization that if fish could be detected with sound waves, so could submarines. Echo devices in various forms (including radar, which employs the same principle in air) thus became major tools of modern warfare

First Application to Fish

But through the early years, fish remained only a nuisance to echo-using mariners until a Norwegian, the late Dr. Oscar Sund, then biological research adviser and one of the leading scientists of the Norwegian Institute of Fisheries, realized that an echo device might be a means of finding more fish for a hungry world. In 1935 a research ship carrying the first echo-sounder ever installed for the purpose of finding fish set out for the Lofoten Fisheries off northern Norway. At the controls was Dr. Sund's aide, Dr. Gunnar Rollefson, now director of the Institute and his country's delegate to the United Nations' subcommittee studying world fisheries

Long before the fishing banks were reached, Dr. Rollefson detected echoes bouncing from strange objects just above the floor of the sea. Although this had been presumed to be barren territory, Dr. Rollefson said, "I believe they're fish, 70 to 80 fathoms deep." Fishermen lowered their lines to 75 fathoms—and immediately caught codfish! As the exploration continued, numerous new fishing banks were found and charted

Oddly enough, owners of fishing boats were not excited by the Institute's report, even after a commercial boat out of Bergen paid off the cost of an echo-sounder with a single catch. Part of the apathy was due to the high cost of the apparatus and the low price of fish, but most of it was because of the fishermen's stubborn adherence to the ages-old methods of fishing

Today this resistance has vanished and Norway leads the world in scientific fishing. Nearly all of its major herring boats and more than half of its ocean-going cod

boats carry fish-finders. Immensely valuable new fishing grounds in that part of the world are being discovered, the annual catch of herring and cod has been increased by a third

The Bendix DR grew out of World War II. Echo-sounders then in use were cumbersome and expensive. U. S. military planners during the war assigned a top-secret project to the Bendix Aviation Corporation—to create portable depth recorders which could be operated silently in total darkness in small rubber boats to discover mine fields along enemy shores and to chart enemy harbors in preparation for invasions

Graph Method Devised

Since flashing lights and buzzing signals were out of the question, the graph method was worked out by electronic wizards, and Bendix DRs preceded invasion troops into countless beachheads. No whisper of their existence was permitted to reach the public, but in 1944, with the war at its height, the U. S. Navy considered the fish-finding potentialities of the device so important for increasing our food supply that a submarine chaser was assigned to aid the Federal Fish and Wildlife Service in tests off the Pacific Coast

The sub-chaser explored waters where no fish were known to be—and found fish constantly. Aquatic biologist Osgood R. Smith, operating the equipment, once located 21 schools in 86 minutes. These data were released to fishermen toward the end of the war

The first Bendix DR was installed on the commercial fishing boat Northern Light out of Fort Bragg, Calif., in 1946. It had formerly taken Capt. Ted Aaker four days to fill his hold with sole and rock cod, but with the magic fish-finder he took 3,000 pounds of these fish, a boat load, in two days on his first trip

Capt. Lawrence Doving installed a fish-finder on his Optu and started through Hecate Strait north of Vancouver Island, B. C., bound for an area at sea where he had been catching dog fish for their livers. No one had suspected there were commercial fish in the Strait, but Capt. Doving was back home the next day with 20 tons of fish. His normal cruise would have been two days each way and eight days of fishing

Capt. Lloyd Lindwall of Santa Barbara, Calif., ordinarily fished for sea bass, shark, albacore and swordfish off Santa Cruz Island, a half-day's run from his harbor. On his second trip with a Bendix DR he was midway to the island when he noticed doodles on the graph. He set his seine and caught a load of sharks whose lives were worth \$10,000

At Vancouver, B. C., a herring seiner turned the air blue when the fish-finding apparatus was not completed in time for him to sail with the rest of the fleet. Leaving port an hour late, he was chugging in the wake of the other vessels when the

Bendix engineer who was aboard as an observer picked up a dense concentration of fish just ahead "It isn't possible," the skipper argued "Every boat in the fleet has passed over them" But the Bendix man persuaded him to set his net—and he was back home in mid-afternoon with a hold full of herring

Tuna fishermen cruising into South American waters out of San Diego, Calif., were plagued by a shortage of small bait fish, a variety of anchovy, which they throw into the water to attract tuna to the boat The exasperated skipper of the tuna clipper American Girl installed a fish-finder on his auxiliary bait-scouting cruiser last season—and immediately found bait where none was supposed to be The graph revealed that the little fish had become wise to the ways of nets and were simply diving under them The skipper foiled this stratagem by using nets which scraped the bottom Now that bait is no problem, he expects to add \$300,000 to his ship's revenue and great quantities of tuna to the nation's food supply this year.

In Cuba tons of fish were discovered and caught in Havana harbor this spring by the first Cuban boat electronically equipped, although no fisherman had suspected they were there So impressed was the Cuban government that special funds were appropriated to equip the nation's 60 major fishing vessels Result the average fishing cruise has been shortened from 25 to 15 days and the average catch has almost doubled

Industry is adapting the fish-finder to all sorts of work Four major oil companies

exploring the Gulf of Mexico, and Lake Maracaibo in Venezuela, use Bendix DRs to detect slight variations on the bottom contour to determine the most advantageous drilling locations At New Orleans a ship-builder uses one to chart the buildup of silt around docks At San Diego, army engineers use several to maintain checks on the depth of ship channels

Infinitely more important, military strategists point out that in the event of war, thousands of small craft electronically equipped could constitute a tight ring of never-closing eyes around our sea-coasts, for fish-finders can ferret out mine fields and submarines with the same sureness that radar warns us of the approach of surface vessels and aircraft

Since DRs cost \$890 to \$2475, depending upon their size and the extent of the range they can "see," they are not yet practicable for the family rowboat, although they can be operated from ordinary automobile batteries When smaller models are perfected they can be expected to eliminate even for sportsmen that imponderable called fisherman's luck

Meantime, while there is a tremendous demand from sport fishing craft, Bendix is allocating almost all its output to commercial fishermen because they believe that this amazing device should be concentrated on providing more food for hungry humanity from the almost inexhaustible resources of the sea

This article was prepared for the SCIENCE NEWS LETTER in cooperation with THE READER'S DIGEST and will appear in the September issue of that magazine

Science News Letter, July 30, 1949

MEDICINE

Allergy-Drug Reactions

➤ EVIDENCE of serious reactions and even one death due to some widely used anti-allergy drugs is presented in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (July 23)

Death resulted in a 16-month-old girl who was poisoned by accidentally swallowing an adult dose of a compound with the trade name of Thenvlene hydrochloride, according to Drs Hugh F Rives, Berl B Ward, and M L Hicks of Dubuque, Iowa

This drug, and the others which gave severe reactions, are antihistaminic compounds used to check the action of histamine, a poison released by body tissues in allergic reactions There are many on the market widely used for such allergies as hay fever, hives, and skin inflammation caused by reaction to drugs. Some have even been used to treat colds

Unfavorable reactions occur in from 25% to 65% of the patients treated with antihistaminics, the physicians stated. Reactions are in the form of drowsiness, vomiting, diarrhea, headaches, nervousness,

fainting spells, severe prostration and mental upsets

Irritation of the brain seems to be responsible for these reactions, the report indicates The physicians add that there is no effective antidote for these drugs If the patient exhibits toxic reaction to the drugs, their administration should be stopped immediately and the individual symptoms should receive treatment

Science News Letter, July 30, 1949

AERONAUTICS

Photoflash Bulbs on Planes Present no Hazards

➤ PHOTOGRAPHIC flash bulbs in an airplane present practically no hazard, the Civil Aeronautics Board has found, and it sees no reason to require or ask special restrictions in their transportation

"Although modern photographic flash bulbs have been fired remotely by high frequency radiant energy (radar) under

ideal laboratory conditions," the Board states, "to date it has been impossible to fire one by this means under actual or simulated flight conditions in all-metal aircraft"

A tragic crash of an airliner following fire in the air in October, 1947, raised the question of whether or not photoflash bulbs could be flashed or exploded by radar energy from within or outside the plane The question was also raised whether they could be flashed by impact, friction, radiant energy, elevated temperatures, electrostatic discharges, changing magnetic and electrical fields and the combustible effect on the standard package containers

Even under extreme conditions met in air transportation, bulbs are not a hazard from these causes, the Board found When modern but defective bulbs were flashed and exploded electrically in a combustible atmosphere of gasoline vapor, no ignition occurred The possibility of firing them by impact and resultant friction is extremely remote, if the bulbs are packed in containers

Science News Letter, July 30, 1949

ENTOMOLOGY

Insect Eggs Found on Outside of Airliner

➤ AIRPLANES may have to be DDT'd outside as well as inside, to prevent hitchhiking by insect pests In the scientific magazine, NATURE, is a report of the discovery of a mass of moth eggs on the wing of an airliner from Brazil that landed at the British airport on Trinidad island

The discovery was accidental A customs officer who had leaned against the plane wing found a smudge on his uniform Investigating, he found the egg mass, which was collected by a malaria control officer and identified as belonging to an insect group embracing several harmful species

Science News Letter, July 30, 1949

AGRICULTURE

Hay Quality Not Bettered By Use of Fertilizer

➤ FERTILIZING land increases the quantity of a crop that can be grown on it but does not raise its quality, experiments at Michigan State College in East Lansing Mich., indicate

Two herds of dairy cows were fed on hay produced on poor soils One herd received hay raised on untreated soil, the other got hay from soil that had been fertilized No material differences could be found in either the nutritional condition of the animals themselves or in the quality of their milk, although a much larger area of unfertilized soil had to be mowed to provide enough hay for the cows it was called upon to support

Science News Letter, July 30, 1949

MEDICINE

Sickle Cell Anemia Theory

➤ THE reason why some individuals develop the severe, disabling, chronic form of anemia known as sickle cell anemia is reported by Dr. James V. Neel, of the heredity clinic, laboratory of vertebrate biology, at the University of Michigan.

"If a drop of blood is collected from each member of a randomly assembled series of American Negroes," he writes to the scientific journal, *SCIENCE* (July 15), "and sealed under a cover slip with vaseline, to be observed at intervals up to 72 hours, in the case of about 8% of the individuals composing the series a high proportion of the erythrocytes (red blood cells) will be observed to assume various bizarre oat, sickle, or holly leaf shapes."

The majority of those who have this peculiarity of the blood cells do not have any disease at all, but a certain proportion have sickle cell anemia.

The reason why only some of those whose

blood "sickles" suffer from sickle cell anemia is explained by a theory proposed by Dr. Neel. If a child has only one parent who sickles, then the child's blood may sickle, but he will not have sickle cell anemia. If, however, the child inherits the sickling trend from both parents, he will not only sickle, but will have sickle cell anemia.

To test this theory, Dr. Neel started to test the blood of the parents of patients with sickle cell anemia. So far he has tested parents for 29 patients. In 13 cases, both parents were tested, in 16 only one. Every parent so far tested has shown the sickling.

These findings suggest a way of wiping out the dread sickle cell anemia. If persons whose blood sickles should avoid marriage with one another, the disease, Dr. Neel says, would tend to disappear, with only a very rare case as a result of mutation in a normal individual married to a person with one or both parents who sickle.

Science News Letter, July 30, 1949

MEDICINE

Pain Has Work Origin

➤ IF YOU think your work is giving you a pain in the neck and arms, you may be quite right and not at all neurotic or rheumatic.

Work pressure, faulty working posture and nervous tension may cause occupational disorders with symptoms that can be confused with rheumatism and neurosis, Drs. Henrik Seyffarth and Kirsten Moenichen of Oslo, Norway, declared at the International Congress on Rheumatic Diseases in New York.

The diagnosis of neurosis is sometimes made, they explained, because the patient's pains vary with his state of mind. The physical condition causing muscle, joint and tendon pain may not show up in a perfunctory examination. And neurosis may be a factor. But "even then," the Norwegian doctors said, "the organic changes are due to overstrain and wear and tear of the skeletal muscles."

Pain in the neck and arms, known to doctors under the medical term, cervicobrachialgia, affected 63% of 222 women clerks of an Oslo insurance firm studied by the Norwegian doctors. Practically all these cases were occupational disorders, the doctors found.

Clear symptoms of occupation myositis, or muscle inflammation, characterized by fatigue pains during work, were found in 51.4% of the women. "This soreness is generally found in the muscles used in static work, particularly in those whose main duty is to maintain an unvaried position while working," Dr. Seyffarth said.

For treatment of these conditions, he recommended heat, massage, X-ray, and, sometimes, novocaine injections. For lasting results, however, rest and relaxing gymnastics, with proper costabdominal respiration and instructions in the correct way of using the muscles in work, were suggested.

Dr. Seyffarth said that prophylaxis should include inspection and correction of the employee's working site and manner of working, plus 10 minutes daily light exercise during office hours, preferably under the direction of a trained physiotherapist. In many offices where these forms of therapy and prophylaxis have been used, he said, "lost working time from cervicobrachialgia has been reduced from 25% to 2%."

Science News Letter, July 30, 1949

ENGINEERING

Clay Under Mexico City Hampers Construction

➤ A SPONGY clay that underlies Mexico City creates a special problem in heavy building construction, the American Society of Civil Engineers was told recently by Ing. Pedro Albin, Jr., engineer of La Latina Americana. The whole plateau on which the city is built is gradually settling, he said, but heavy structures may settle at a faster rate.

He cited as an example one structure built on piles to avoid settlement which appears to grow in height as the level of

the surrounding street falls. He cited, also, the case of a concrete building which has settled in a five-year period so that the ground floor is now a foot below street level. For the past 30 years, he stated, long wooden piles, some 112 feet in length, have been driven under buildings to secure support from a deeper and stronger stratum.

To avoid settlement of a building now under construction, it is proposed to mount the ground-floor slab on screws so that it can be lowered as the surrounding streets settle. For the same building, a long type of concrete pile is being introduced from the United States. It has a precast concrete "button" on the end, which makes it adapted to foundation conditions similar to those encountered in Mexico City.

Science News Letter, July 30, 1949

GENERAL SCIENCE

Touch Museum Exhibits Are for the Sightless

➤ A TOUCH museum exhibition for the blind in London now has 60 science displays for sightless visitors.

The exhibit, believed to be the first of its kind in the world, is located at The Science Museum of South Kensington. Only the blind or persons accompanying a blind person are permitted to attend the exhibit.

Displays ranging from mathematical principles to modern transport are placed on tables about waist-high so that they can be conveniently touched. Each display has a label in braille and a longer description which can be read to blind visitors by their escorts.

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ENGINEERING-AERONAUTICS

Helicopter Propellers To Be Tested on Giant Motor

➤ A GIANT electric motor will soon be in use at the Wright-Patterson Air Force Base, Dayton, O., in a program for the development of propellers for bigger and better helicopters. It was built for the Air Force by Westinghouse Electric Corporation, weighs 48 tons and is rated at 4,000 horsepower.

The motor is to be installed on a steel tower 30 feet from the ground where it will be able to spin high over the disturbances caused by ground-level air currents. It is not intended for airborne use, but is merely to provide test facilities for the necessary propeller experiments.

If actually used in a helicopter, it could lift craft weighing 50,000 pounds. This is about five times the weight of the largest helicopters now in use. Present aircraft of this type use motors ranging from 65 to 550 horsepower, with propellers up to 48 feet in diameter.

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Season of Sneezes

► THE ragweeds, low and tall, will begin shedding pollen in the northern states in a few days, and will continue to keep sensitive noses and eyes miserable until well into September. In the South, ragweed pollen seasons begin later, about mid-August or even the first of September, but last into October. Southernmost ragweed patches, far down in Texas and Florida, however, seem able to pour their irritating dust into the breezes from early July until late October, or even longer.

Ragweeds figure most importantly as hay-fever causes in this country. Although pollens from some dozens of other plant species do provoke this most distressing type of allergy in some persons, at least nine-tenths of all cases are primarily due to the pollens of these two weeds.

Although they are botanical first cousins, low ragweed and tall ragweed do not look very much alike. Low ragweed is usually about knee-high to a tall man, seldom more than waist-high. Its leaves finger out into many fine subdivisions. Tall ragweed ranges normally from head-high to more than twice that, and its big, coarse leaves are three-lobed—like mittens with two thumbs instead of one.

In classifying plants, however, botanists

go by the flowering structures; and in these the two weeds are very much alike. The pollen-shedding or male flowers (which are the business end of the weed, so far as hay-fever causation is concerned) are borne in long spikes at the top of the plant.

Many communities now attack their ragweed patches early in the season with 2,4-D or other chemical weedicides, instead of laboriously scything them down, as form-

erly. Even if this precaution has been neglected in your neighborhood, however, and the ragweeds are ready to shed their pollen, much of the mischief can still be prevented if action is taken promptly. A good spraying now may not kill the troublesome growths outright, but it will largely abort the flowers and prevent the shedding of the pollen.

Science News Letter, July 30, 1949

GENERAL SCIENCE

Attack AEC Clearance

► A PROPOSAL to require Federal Bureau of Investigation clearance for all holders and applicants for Atomic Energy Commission fellowships is under attack from some scientists.

Sen. Joseph C. O'Mahoney, D., Wyo., is offering an amendment to the Independent Offices appropriation bill, which carries AEC funds, calling for the blanket FBI investigation of AEC fellows.

AEC fellowship holders are now required to sign a loyalty oath and non-Communist affidavit. This was inaugurated in May after the discovery that a University of North Carolina student receiving AEC funds was an admitted Communist.

Any of the AEC fellows doing secret work or using secret information are investigated by the FBI, but many of the students aided by the fellowships have no contact with such material.

When the issue of an FBI clearance for all AEC fellows came up in May, Sen. O'Mahoney and others supported it. But vigorous objection was voiced by leading scientists, including several who approved the oath and affidavit adopted by the Commission.

Among the scientists who have publicly opposed extending the FBI investigation to fellowship holders doing non-secret work are Dr. Detlev W. Bronk, president of Johns Hopkins University and chairman of the National Research Council which administers the AEC fellowship program, Dr. J. Robert Oppenheimer, director of the Institute for Advanced Study, Princeton, N. J., Dr. Alan Gregg, director of medical sciences for the Rockefeller Foundation, Dr. Lee A. DuBridge, president of the California Institute of Technology, and Dr. Enrico Fermi, Institute for Nuclear Studies, University of Chicago.

Chief points made by these scientists and others are that the FBI investigation is unnecessary where no secrets are involved and that such investigations would be against the traditions of both science and the nation.

In support of the investigation, Sen. O'Mahoney has explained that he wants to make sure no atom fellowships go to Communists.

Latest attack on the proposal is a letter signed by representatives of several sci-

entific, educational, religious and political groups urging that the amendment be withdrawn.

The letter just made public attacks the investigation as being "at variance with our democratic tradition and procedures." It urges more public discussion of the issue before it is decided.

Science News Letter, July 30, 1949

ORNITHOLOGY

Ducks Forced Northward By Drought Conditions

► DUCKS have been having their drought troubles, too, this summer, states F. C. Lincoln of the U. S. Fish and Wildlife Service. Flocks flying north last spring found their usual nesting sites in the southern parts of Canada's prairie provinces and the north-central states of this country badly dried up. So they had to keep on going until they found adequately wet habitats in the "bush" country of Canada, and even on up into the margins of the tundra. That is where they are now, but it is definitely second-rate housing so far as ducks are concerned.

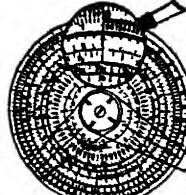
At that, though, the situation might have been worse, Mr. Lincoln adds, philosophically. If there had been enough water on the usual duck range to induce them to nest, and if drought had come after their families had been started, the mortality among the new generation of ducklings would have been extremely high. As it is, the ducklings are getting at least some kind of a break, although they are more exposed to attacks from their enemies than they normally are on the southern parts of their range.

Despite this unfavorable situation, there will be a good increase in the duck population this year. Only, it would have been very much larger had breeding conditions been more nearly normal.

In the meantime, rains have fallen over much of the normal duck country—but there are no ducks there to enjoy the renewed wetness. However, the water-plants on which ducks like to feed are growing apace now, so that when the autumn flights start southward there should be plenty of food waiting for the migrants.

Science News Letter, July 30, 1949

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Books of the Week

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THE ADRENAL CORTEX—R. Gaunt and others—*New York Academy of Sciences*, 170 p., illus., paper, \$3.00. This monograph is concerned largely with new and specialized aspects of the subject.

ANALYTIC GEOMETRY—John J. Corliss, Irwin K. Feinstein, and Howard S. Levin—*Harper*, 370 p., \$3.25. A text for the student of mathematics or engineering.

ANTIBIOTICS DERIVED FROM *Bacillus Polymyxa*—P. H. Long and others—*New York Academy of Sciences*, 160 p., illus., paper, \$2.25. Historical aspects of *Bacillus Polymyxa*—its discovery and development.

ATOMIC ENERGY YEARBOOK—John Tutin, Ed.—*Prentice-Hall*, 237 p., illus., \$3.85. A history, a contemporary account, and a prediction of things to come. Contains not only the technical data on atomic energy but also the social effects upon us.

CALCULUS—Lyman M. Kells—*Prentice-Hall*, 2nd ed., 508 p., illus., \$5.35. An introductory text.

THE CHINA THAT IS TO BE—Kenneth Scott Latourette—*Oregon State System of Higher Education*, 56 p., paper, 75 cents. A short history of the China that has been, the China that is, and the China that is to be.

CONSTRUCTIVE USES OF ATOMIC ENERGY—S. C. Rothmann, Ed.—*Harper*, 258 p., illus., \$3.00. Describes the uses to which the "Peaceful Atom" has already been put and its potentialities. Written from the point of view of

intelligent laymen by leaders in atomic research.

DISPOSAL OF SOUTHERN WAR PLANTS—Friedrick L. Deming and Weldon A. Stein—*National Planning Association*, 74 p., illus., paper, 50 cents. Deals with the disposal of federally-financed manufacturing and how it has been adapted to peacetime needs. Data prepared by NPA Committee of the South.

POLIO CAN BE CONQUERED—Alton L. Blakeslee—*Public Affairs Committee*, 31 p., illus., paper, 20 cents. Information for the layman and tips for parents.

SELECTED PUBLICATIONS AND MATERIALS RELATING TO AMERICAN FOREIGN POLICY—*Division of Publications, Department of State*, 22 p., paper, free upon request to publisher, Washington 25, D.C. A bibliography of all publications still available with the exception of those which are of purely historical interest.

U.S.A. MEASURE OF A NATION—A Graphic Presentation of America's Needs and Resources—Thomas R. Carskadon and Rudolph Modley—*Macmillan*, 101 p., illus., paper, \$1.00. Presenting in pictorial graphs statistics on American economy since 1850 and indicating expected developments to 1960.

THE WORD BANK—Sophie Basescu—*Rodale*, 189 p., \$3.00. Will help writers to find just the right word or to produce variety. Divided into sections of related words.

Science News Letter, July 30, 1949

MEDICINE

Range of Vision Enlarged

➤ A LOOK in time saves embarrassment, especially in patients who are blind in one eye and cannot see persons or objects approaching them from their blind side. To help them, a mirror attachment for their glasses has been devised by Dr. Eric Bell, Jr., and associates at the Cleveland Clinic and the Frank E. Bunts Educational Institute in Cleveland.

The mirror has a convex surface and is attached at right angles to the plane of the lens of the glasses at the bridge of the nose. In this way the patient glimpses movement on his blind side and turns his eyes that way, Dr. Bell explained in the *JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION* (July 23).

These patients were afflicted with hemianopia, which is a partial or total paralysis of some of the optic nerve fibers, restricting part of the field of vision. They complained that they underwent constant danger and embarrassment because they failed to see moving cars, collided with other pedestrians when looking in shop windows and failed to see food passed to them at the dinner table, Dr. Bell said.

The gadget added to the glasses, Dr. Bell declared, helped to increase the field

of vision in these patients. In a few weeks they were able to interpret what they glimpsed in the mirror and because of its position there was the added advantage that the father they turned their eyes to the unaffected side, the wider and clearer was the reflection seen in the affected eye.

Dr. Bell believes that this device may be adapted to other visual defects that limit the range of vision.

Science News Letter, July 30, 1949

ECOLOGY

Snakes, Rats and Birds Thrive on A-Bomb Site

➤ WORLD'S first atomic bomb blast, at the Trinity site near Los Alamos, N. Mex., four years ago July 16, apparently has had no ill effect on succeeding generations of animals and the desert vegetation is recapturing the area of the burst's crater.

But scientists are still looking for any possible after effects which might remain in living things in the area, Atomic Energy Commission officials said.

University of California scientists, under contract to the Commission, this summer

are continuing a survey of crater area and "fall-out" region. The fall-out refers to the bits of radioactive material from the blast which gradually settled out of the atmosphere after the explosion.

Mice, rats, rabbits, snakes, lizards and birds in the region have been studied, but they all appeared to be normal and in good health.

Weeds and grasses have appeared where the bomb was exploded, and scientists predict that the crater area will in due time become reestablished with the typical desert vegetation.

Most important scientific studies relating to the blast effects on life are now being carried on at the University of Tennessee in Knoxville, where a herd of range cattle accidentally exposed to fall-out are now under study. This study will go into several generations and require several more years, but thus far no ill effects from radiation exposure have been reported.

Science News Letter, July 30, 1949

Words in Science— PSYCHOSIS-NEUROSIS

➤ MEDICAL name for the serious mental diseases is psychosis, pronounced sigh-koe-sis (plural psychoses). A person affected by a psychosis is, in some respects at least, out of touch with the world of reality. He often does not realize that he is ill.

A neurosis, pronounced new-roe-sis, is a much milder form of mental disorder that is often popularly called "nervous break-down." The sufferer usually knows very well that he is ill, and continually seeks medical aid to cure him. The neurotic person may be in the grip of abnormal fear, worry, or may feel compelled to repeat certain gestures or acts that have no meaning in terms of the immediate situation, but ordinarily he sees the world around him just about the same as his neighbors do.

Science News Letter, July 30, 1949

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☼ **SUN-TAN METER**, which does not measure the tan on the human body but determines the degree of tanning energy in either sunlight or from artificial lamps, consists of filters, light-sensitive cells and a recording device. The cells under ultraviolet tanning radiation become sources of electricity which activate the meter.

Science News Letter, July 30, 1949

☼ **FLUSHING RACK** for baby diapers is a simple chrome-plated flexible wire bracket that snaps into the forward part of the modern flush toilet. Two spring holders on it grasp the diaper by a clean corner, flushing the toilet once or twice does the rest of the job.

Science News Letter, July 30, 1949

☼ **SCUFF PLATES**, for office survival chains of the revolving type, are made of a tough resilient plastic and are attached with cement to the bases to protect them from shoe-heel scratching. They are chip-proof, naturally lustrous, have long life and are easily cleaned.

Science News Letter, July 30, 1949

☼ **OILER** for home or office, shown in the picture, is fountain-pen size with a transparent plastic container so that the level of the oil is always visible. In use, a steel tip on the oiler is depressed on the part to



be lubricated and then released. Each time this is done, a little oil is ejected.

Science News Letter, July 30, 1949

☼ **WINDOW GUARD** of four nickel-plated steel bars eliminates any possibility of a youngster's tumbling out. The easily attached guard, which requires no tools to install, is for standard steel casement windows only, and is secured in position

by expansion action produced by a nut on one end of each bar.

Science News Letter, July 30, 1949

☼ **PORTABLE ELECTRIC** radiator for heating resembles an ordinary steam radiator but contains no water or steam. Heating elements are fully enclosed, and its convenient carrying handle can be folded over to provide a drying rack for small articles of wear.

Science News Letter, July 30, 1949

☼ **TWO-MAN PUP TENT**, made of nylon fabric, is designed for sportsmen and is dome-shaped with a perimeter of nearly 26 feet. Weighing only 9.5 pounds, it fits over an aluminum frame, making pitching and striking the tent a matter of a few minutes. It keeps out water, wind and insects.

Science News Letter, July 30, 1949

☼ **GUARD RAILS** for a youngster's bed are triple-bar devices attached in a horizontal position by metal uprights that may be quickly clamped to the wooden rails on each side of the bed. Easily disassembled, they are of value to travelers spending a night where special beds for children are not available.

Science News Letter, July 30, 1949

Do You Know?

The *water tupelo*, a tree of southern swamps, grows in locations which are under water for a large part of the year; it sometimes attains a height of 100 feet and a low trunk diameter of three to four feet.

If *Alaska's* water resources were properly harnessed they could produce over 8,000,000 kilowatts of electricity, or about one half as much as the present output in the United States, proper.

Alfalfa stands at the head of the list of all common hay crops because of its high yield per acre, its value in protein, its high calcium content and its value as a source of several important vitamins.

A promising feature in the construction of *dry cells* for electrical uses is the substitution of magnesium for the zinc now employed; there are many uses for zinc and the supply is not plentiful, while the magnesium supply is unlimited.

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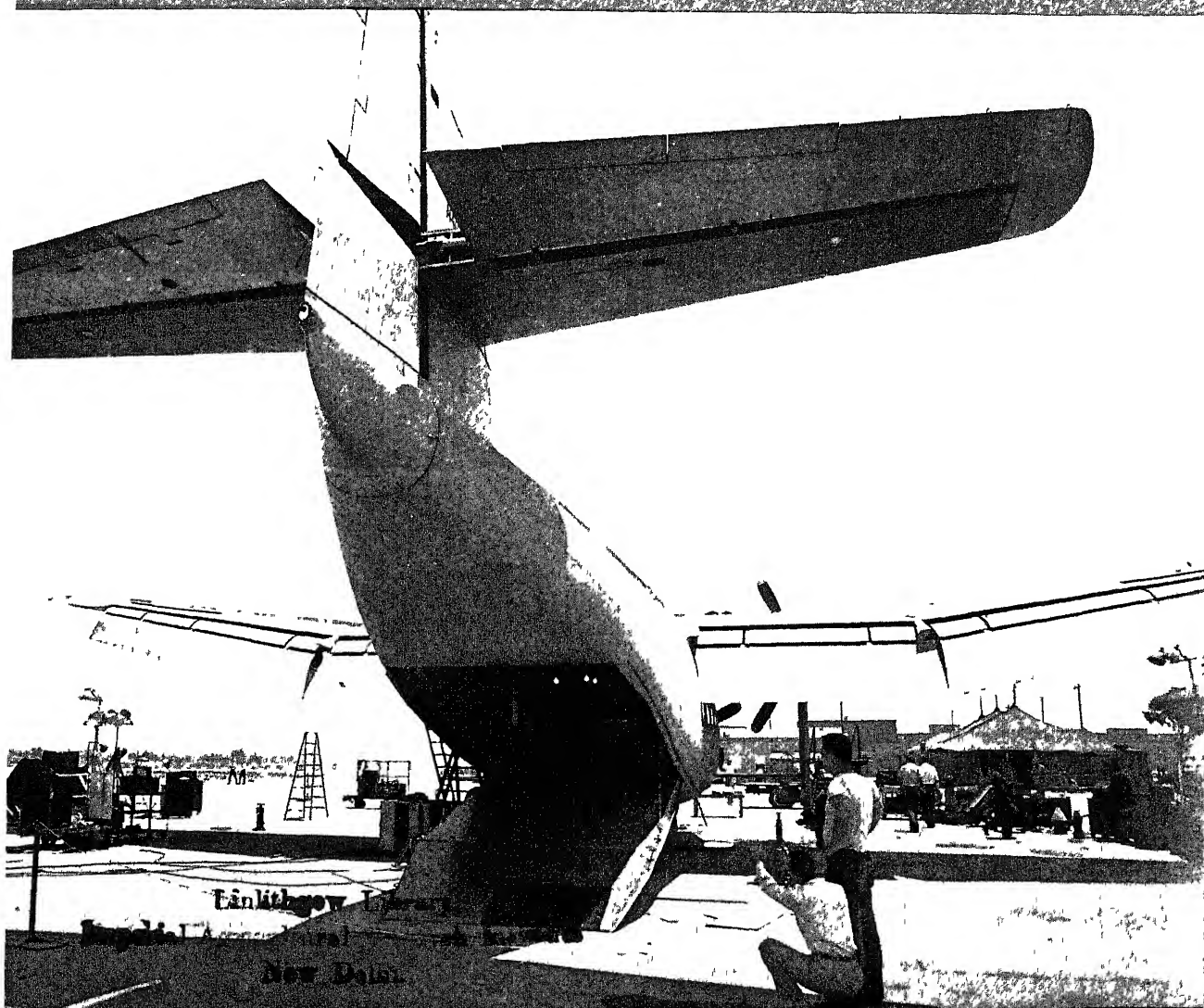
AUGUST 6, 1949

SCIENCE NEWS LETTER



®

THE WEEKLY SUMMARY OF CURRENT SCIENCE



Arctic Assault

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A SCIENCE SERVICE PUBLICATION

YEAR

VOL. 56 NO. 6 PAGES 81-96



THE FUTURE HOLDS GREAT PROMISE

Neither chance nor mere good fortune has brought this nation the finest telephone service in the world. The service Americans enjoy in such abundance is directly the product of their own imagination, enterprise and common sense.

The people of America have put billions of dollars of their savings into building their telephone system. They have learned more and more ways to use the telephone to advantage, and have continuously encouraged invention and initiative to find new paths toward new horizons.

They have made the rendering of telephone service a public trust, at the same time, they have given the telephone companies, under regulation, the freedom and resources they must have to do their job as well as possible.

IN THIS climate of freedom and responsibility, the Bell System has provided service of steadily increasing value to more and more people. Our policy, often stated, is to give the best possible service at the lowest cost consistent with financial safety and fair treatment of employees. We

are organized as we are in order to carry that policy out.

BELL Telephone Laboratories lead the world in improving communication devices and techniques.

Western Electric Company provides the Bell operating companies with telephone equipment of the highest quality at reasonable prices, and can always be counted on in emergencies to deliver the goods whenever and wherever needed.

The operating telephone companies and the parent company work together so that improvements in one place may spread quickly to others. Because all units of the System have the same service goals, great benefits flow to the public.

Similarly, the financial good health of the Bell System over a period of many years has been to the advantage of the public no less than the stockholders and employees.

It is equally essential and in the public interest that telephone rates and earnings now and in the future be adequate to continue to pay good wages, protect the billions of dollars of savings invested in the System,

and attract the new capital needed to meet the service opportunities and responsibilities ahead.

There is a tremendous amount of work to be done in the near future and the System's technical and human resources to do it have never been better. Our physical equipment is the best in history, though still heavily loaded, and we have many new and improved facilities to incorporate in the plant. Employees are competent and courteous. The long-standing Bell System policy of making promotions from the ranks assures the continuing vigor of the organization.

WITH these assets, with the traditional spirit of service to get the message through, and with confidence that the American people understand the need for maintaining on a sound financial basis the essential public services performed by the Bell System, we look forward to providing a service better and more valuable in the future than at any time in the past. We pledge our utmost efforts to that end.

LEROY A. WILSON, *President*
American Telephone and Telegraph Company
(From the 1948 Annual Report)

BELL TELEPHONE LABORATORIES Exploring and inventing,
devising and perfecting, for continued improvements and economies in telephone service



MEDICINE

Leukemia Death Sign

Research shows there is a relationship between the amount of histamine in the blood and the white blood cell count. Death follows when the histamine is low.

► A SIGN in the blood of leukemia patients which shows up when death is near and may have important implications in the treatment and understanding of the disease has been reported by University of California Medical School scientists.

This sign is bound up in a mysterious relationship between the white blood cell count and the amount of histamine in the blood of leukemia patients. Leukemia is a disease marked by overabundance of white blood cells.

The scientists noted that in patients who are doing well there is present in the blood much more than the normal amount of histamine, a chemical present in all living cells. The overabundance of histamine was just about proportional to the overabundance of white blood cells.

They found that patients with high white cell counts who had only normal or sub-normal amounts of histamine died within a month.

After this was noted, efforts were made

to stimulate formation of histamine in the blood, in hopes that this would strike the curious balance found in the more fortunate patients. Epinephrine, a histamine-promoting chemical, was used. The effort failed, but research along these lines is still continuing.

The research was reported in the NATIONAL CANCER INSTITUTE JOURNAL by Drs. Michael B. Shimkin, director of the University's Laboratory of Experimental Oncology, and Drs. Leo Sapirstein, Franz R. Goetzel, Priscilla M. Wheeler, and Nathaniel I. Berlin.

Two cases, additional to those reported in the scientific paper, illustrated how the mechanism operates.

Patient No. 1 had a white cell count of 200,000—the normal is 5,000 to 10,000. His histamine level was 400 to 700 micrograms per 100 cubic centimeters, the normal being under 10 micrograms. Radioactive phosphorus treatment lowered the white cell count to 15,000 and the histamine level to

15, and this was accompanied by a regression of symptoms.

Patient No. 2 had a white cell count of 60,000, with histamine levels of 30 to 50 micrograms. When the white blood cell count went up to 120,000, the histamine level dropped to 3.5 micrograms, and the patient died within eight days.

The scientists suggest that there is at work a homeostatic mechanism, a system of natural checks and balances by means of which the body tries to counteract its difficulties. Thus when the white blood cell count goes up dangerously, the body tries to combat it. When successful, the histamine level goes up correspondingly. Failure results in a drop of histamine and death.

The findings have suggested several new lines of research, which may yield important results in both treatment and understanding.

Science News Letter, August 6, 1949

GENERAL SCIENCE

Soviet Science Translated By Atomic Laboratory

► IF YOU want to know what Soviet scientists are writing about and you can't read Russian, you can get the information from the Atomic Energy Commission's Brookhaven National Laboratory, at Upton, N. Y., on Long Island.

This government-supported scientific agency is the largest distributor of Soviet scientific information in the nation. Instead of being chased by the FBI, it is winning the praise of scientists, military men and industrialists who want to know what is happening behind the iron curtain.

About September, 1947, as part of the conflict between the East and West, all Russian scientific journals stopped publishing titles and abstracts in languages other than Russian. Many of the 30 journals issued by the USSR Academy of Sciences used to have English titles and abstracts. Even the all-Russian issues are readily available outside the Soviet Union within several months of their publication, the Brookhaven authorities found. So they now issue translations of the titles of all articles in Russian scientific journals, ranging from astronomy to zoology. All physics articles, including nuclear science, are given in English abstracts. Complete translations are made of articles they consider significant, either to the atomic energy program or to science in general.

Seven issues of "Guide to Russian Scientific Periodical Literature," prepared under the direction of Prof. John Turkevich, of Princeton's chemistry department, and Dr. Ludmila Turkevich of Princeton's modern language department, have been issued.

In the science field, non-cooperation of the Soviet government through barring of English translations is being countered by this U. S. A. government effort.

Science News Letter, August 6, 1949



RARE MONSTER—In classical antiquity, the chimera was a fabulous monster. In modern ichthyology, chimeras still look rather that way. They are a kind of missing-link fish, midway between skates and sturgeons, with cartilaginous skeletons and (often) long, pointed snouts. This specimen, one of four dredged up at depths of from 2,700 to 3,000 feet off the New England coast by the Woods Hole Oceanographic Institution's laboratory ship, *Caryn*, belongs to the extremely rare species *Harriotta raleighana*.

NUCLEAR PHYSICS

Atom-Smasher Isotopes

➤ **RADIOACTIVE** isotopes—the exploding chemical elements used for scientific research—will be produced for scientists in the famed atom-smashing cyclotron, the U S Atomic Energy Commission announced.

These important tools of modern science have been produced in the chain-reacting atomic furnace in Oak Ridge, Tenn., and shipped to scientists for nearly three years. But use of cyclotrons will give a wider variety of isotopes than is possible for the pile.

Under this plan, the Carbide and Carbon Chemicals Corporation is authorized to purchase cyclotron time for making isotopes from institutions which have these atom-smashers. Institutions which will be utilized include the Massachusetts Institute of Technology, University of Pittsburgh, Washington University, and the Crocker Radiation Laboratory at the University of California. Assistance to the general program will be rendered by the department of terrestrial magnetism of the Carnegie Institution of Washington.

Some of the elements and their atomic weights which will be available to scientists for the cyclotron production include beryllium 7, sodium 22, iron 59, iron 55, zinc 65, arsenic 63, and iodine 125. Only isotopes with a half-life longer than 30 days will be shipped at first. The half-life is the length of time in which the radioactivity of the isotope is diminished by half.

The AEC said that the new cyclotron-isotope program was strongly urged by the National Research Council, because of the need for the additional varieties of isotopes it can make available.

Cost of the newly-available isotopes will be higher than the pile-produced ones, so the AEC plans to subsidize the program.

As with the pile isotopes, distribution will be made free of charge for cancer research.

Processing of the isotopes will be carried on at the Oak Ridge National Laboratory.

Because cyclotrons are available in many countries abroad, the new program will be limited to the United States and its territories and possessions.

Science News Letter, August 6, 1949

ICHTHYOLOGY

Record Fish May Have Had Too Much Mouth

➤ **WHEN** is the mouth of a bass small? That's the scientific puzzler which may upset a world's record in fishing.

Walter Harden is credited with catching the world's record smallmouth bass, a 14-pounder, 28 inches long, in Lake Apopka, near Oakland, Fla. But two scientists now contend the fish wasn't a smallmouth bass.

Dr. Carl L. Hubbs of the Scripps Institution of Oceanography and Dr. Reeve M. Bailey of the University of Michigan have just published a study of black basses. Among their scientific observations is their opinion that Mr. Harden's record-breaker was really a largemouth bass.

It's really difficult for the average sportsman to distinguish between the two basses, the biologists point out, but some of the features which differ are the coloration, scales, body shape and, oh, yes, the size of the mouth.

"We recommend the removal of the Florida fish from consideration for the title of 'world's record' smallmouth bass," write the scientists, but they "leave to others the decision as to what fish deserves the distinction of holding the record."

Science News Letter, August 6, 1949

On This Week's Cover

➤ **THIS** model of the new Northrop Raider C-125 military assault transport shows it with its huge jaw-like ramp door open. This plane can be loaded with five tons of cargo in a few minutes. It has been designed to operate from small, unsurfaced airstrips by virtue of its double-slotted flaps, heavy-duty, fixed landing gear, and three engines. A total of 23 of these planes are being built for the Air Force for use in Arctic rescue work.

Science News Letter, August 6, 1949

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ZOOLOGY

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GENERAL SCIENCE

Science Clubs Abroad

Six hundred foreign science clubs affiliated with Science Clubs of America form the nucleus for international expansion of this movement.

➤ GROUPS of young people will be studying and working in science in many countries during the coming school year as a result of the impetus given to international science clubs by a conference held at UNESCO, the United Nations Educational, Scientific and Cultural Organization, in Paris.

Representatives from nine nations and reports from many other areas were received during a two-day meeting (July 15-16). Leaders of science youth organizations working in many lands and languages became acquainted and exchanged experiences.

The American experience developed through years of experience with Science Clubs of America and the Science Talent Search formed the basis of the projected extension of science club work to all nations. The 600 foreign clubs already affiliated with Science Clubs of America form a nucleus for the international expansion of the movement.

In France, representatives of the national departments of education and colonial affairs, the French national radio, a leading science journal, a youth center and other interested organizations are discussing a joint sponsorship of the organization of science clubs for youth.

Czechoslovakia is planning science clubs in every secondary school during the coming year.

Denmark is expanding its youth science organizations and so is Holland.

For Latin America, UNESCO is planning a traveling exhibit to demonstrate the methods and advantages of science organization by young people.

Interest in science clubs was also reported from Poland, Switzerland, England and other nations.

Delegates and observers at the science clubs conference were presented the science Clubs of America emblem by Watson Davis, director of Science Service, who was elected chairman of the conference.

Director General Jaime Torres Bodet of UNESCO opened the conference, telling the delegates:

"Yours is the rare privilege of disseminating, humanizing and advancing the cause of science. It enables you to help train men who will be, not mere scientists, but citizens with deeper insight into the possibilities and dangers of the world today. Whether they make a name for themselves through far-famed discoveries or merely perform a more humble yet necessary task, the members of your clubs will have this

in common. They will together have fought against ignorance and prejudice, worked methodically with ever open minds, faithfully carried out their task, great or small, and with their deeper knowledge of the world about them, will better understand the bonds which unite mankind in a common destiny."

Dr. Pierre Auger, French physicist and cosmic ray authority, participated in the conference as the head of the natural sciences department of UNESCO.

Just as Science Service through Science Clubs of America supplies material and inspiration to between 12,000 and 15,000 science clubs in the USA each year, without charge, so an identical service without charge is being offered by Science Service to all science clubs, already organized or in the process of organization, in all countries.

An exhibition of science club work in various countries and a display of educational and industrial materials supplied to science clubs largely by American organizations was opened at UNESCO at the time of the conference.

Science News Letter, August 6, 1949

FORESTRY

Douglas Fir Bark Yields Waxes and Tannin

➤ WAXES for all sorts of waterproofing, and tannins for making leather, are available in large quantities in the little used bark of the Douglas fir stripped from the logs in the sawmills, a symposium on wood was told in Washington by Phinister B. Proctor of the Oregon Forest Products Laboratory. This symposium was sponsored by the National Research Council and the Office of Naval Research.

Taking part in the two-day symposium were many of the nation's experts on wood from industries, universities and the government. In spite of the development of new materials, such as plastics, wood is more important now than ever before. The scientists considered many questions relating to wood and its uses, particularly



SCIENCE CLUBS ORGANIZED INTERNATIONALLY — Dr. Jaime Torres Bodet, UNESCO director general, opens a UNESCO meeting in Paris to discuss an extension of the science club movement to all parts of the world. Left to right: B. Bendt-Nielson of Copenhagen, Denmark; Dr. Pierre Auger, head of UNESCO Natural Sciences Department; Dr. Torres Bodet; Borge Michelsen and Maurice Goldsmith, of UNESCO; and Jouko Haavisto of Helsinki, Finland.

in connection with military and industrial requirements

Oregon alone produces annually nearly a million tons of bark in connection with lumbering operations, and most of it is Douglas fir. Only a small amount of it is used for other purposes than for fuel. One company was reported by Mr. Proctor to be using mechanical means to separate ground bark into cork particles, needle-like bast fibers, and a fine powder. These fractions, he said, are being sold for use as ground mulches, absorbents, fillers, plastic and resin extenders and carriers of insecticidal dusts.

In addition to waxes and tannins, Douglas fir bark yields dihydroquercetin and phlobaphene. The first is a new compound and is a coloring matter similar to quercetin. Its commercial possibilities are not yet known. Phlobaphenes, because of their phenolic nature, have possibilities for use

as extenders for plastics and synthetic resins.

The total extractive content of Douglas fir is approximately 30% of the oven-dry weight of the bark. The proportions of the individual extractives are, however, found to vary with the age of the trees and the height of the bark above ground. In general, wax yields are highest from the bark at the bases of old trees. Tannins are most plentiful in the youngest bark at the tops of the youngest trees.

The extraction process is a simple one, involving no new principles and requiring no specialized equipment. A pilot plant at the Oregon Forest Products Laboratory consists of a batch extractor in which benzene is pumped through the shredded bark. From the liquid mixture obtained, the benzene and water are evaporated off, leaving the extractives.

Science News Letter, August 6, 1949

ENGINEERING

Rammed Soil for Building

➤ THE present high cost of building has aroused scientists to find new methods of construction with earth as a building material, and technical men at the Texas Engineering Station have issued a report of recent investigations relative to rammed-earth construction. It contains valuable suggestions about the types of soil satisfactory for this purpose, as well as techniques for their use.

There is nothing new in the idea of using earth as a construction material. Brick is baked earth. The adobe houses long used in the world are sun-baked brick. The so-called mud-suck homes of early American Indians were made of adobe material plastered on the inner and outer sides of a stick framework to form a house. The outer houses of pioneer days on the prairie are examples of earth dwellings. The rammed-earth construction is merely another type of structure using earth for its sidewalls. In it, earth is tamped within temporary forms similar to those used in concrete construction.

At a time when construction costs are almost prohibitive to the middle and low income groups, rammed earth offers durable construction at minimum cost, the report states. For a building that costs less to heat, or cool, has very low insurance rates, requires little maintenance, is insect- and vermin-proof, lasts indefinitely, is soundproof, strong, and has architectural beauty, its use should not be overlooked.

Soils that are satisfactory for buildings can be found in nearly all parts of the world, or can be made up by mixing nearby soils. The investigations show that a suitable soil is one predominantly sand with sufficient silt and clay to serve as a binder or natural cementing agent. The most favorable mixtures are 70% to 80% sand and

the rest silt and clay. All organic matter, such as grass roots, should be removed, and the larger stones as well.

With certain soils, it is advisable to add a special binder such as vinsol resin, portland cement, or a mixture of the two. In most cases of rammed-earth construction, however, it may be more efficient and economical to use no admixtures whatsoever, but to add a weather-resisting outer coating, according to Edsel J. Burkhardt of the Station staff. Asphalt, paints, and portland cement stuccos were all tested, as well as special commercial products prepared for the purpose.

Science News Letter, August 6, 1949

BACTERIOLOGY

Penicillin in Cows' Milk Checks Cheese Formation

➤ PENICILLIN can make trouble for the manufacturers of certain types of cheese, Drs. H. Katznelson and E. G. Hood of the Canadian Department of Agriculture point out in the journal, *SCIENCE* (May 13). Cheddar cheese, for example, is produced by the bacterial fermentation of milk. When cows have been treated with penicillin to cure mastitis, a bacterial inflammation of their udders, enough of the drug may carry over into their milk to kill or inhibit the useful, cheese-forming bacteria.

Drs. Katznelson and Hood carried out a series of experiments in which penicillin was added directly to milk that had been inoculated with the cheese-making bacteria. Above a certain low concentration, the drug stopped the cheese-forming action.

It was possible, however, to offset the effect of the penicillin by adding also an appropriate quantity of penicillinase, which

is an enzyme that destroys penicillin. The two Canadian scientists suggest that this precaution be taken by cheese producers when they are using milk from penicillin-treated cows.

Science News Letter, August 6, 1949

WILDLIFE

Blame Fox for Trying, Not for Succeeding

➤ FOXES eat few birds. It's not that a fox doesn't try, he simply can't catch many.

Exaggerated claims that foxes are responsible for the scarcity of game birds are hit by Dr. W. J. Hamilton, Jr., Cornell University zoologist.

"Few birds are taken," says Dr. Hamilton, "but this is not because the fox is not fond of them. They are not as easily caught."

The scientist has examined the stomachs of more than 1,000 specimens over the past 20 years. He found the fox's food during spring, summer, and early fall includes various fruits and berries and chokecherries, and for animal foods, woodchucks, cottontails, and especially field mice. Chipmunks and other small mammals are also included in the pie of the fox.

Winter food is primarily cottontail rabbits and field mice, with some frozen fruit included. A fox will often dig into the snow to get frozen apples.

"While fond of grouse and pheasant, the fox finds it easier to dine on chipmunk. Not only are the chippies more numerous, but they cannot take to the air as the game birds do when pursued."

Though the fox may destroy a few grouse, he actually is an asset to the grouse through his destruction of the more potentially dangerous chipmunk, which is a predator of grouse, Dr. Hamilton pointed out.

Science News Letter, August 6, 1949

PHYSIOLOGY

The Joint Is Cold, Knee Joint, That Is

➤ IT'S NOT "cold shoulder," but cold knee. Measurements made with a new electric thermometer of the knee joint temperatures of two men gave readings of 90.3 degrees Fahrenheit and 91.2 degrees. Normal body temperature is usually considered to be in the neighborhood of 98.6 degrees.

The temperature of the knee joint is taken by threading a tiny bit of a thermometer through the joint with a hypodermic needle. Dr. J. M. Benjamin, Jr., of the University of Pennsylvania's graduate school of medicine and Steven M. Horvath of the University's Moore School of Electrical Engineering made the experiments, which are reported in the journal, *SCIENCE* (June 10).

Science News Letter, August 6, 1949

MEDICINE

Isolate Live Cancer Virus

Freezing of cancer tissue has liberated a potent cancer virus which infects the chest tissue of mice, British scientists reported.

➤ ISOLATION of live cancer virus from infected mice was announced in the *BRITISH MEDICAL JOURNAL* (July 30)

The virus produces cancer only in the chest or mammary tissue. American scientists have shown that it can be transmitted through the milk of nursing mice to their young. However, the chemical oestrin had to be present to make the virus potent.

In these experiments, reported by Dr. Ida Mann of the Imperial Cancer Research Fund, London, the active virus was freed from the cancer tissue by freezing it to 110.2 degrees below zero Fahrenheit.

Injections of this liberated virus into male and female mice produced tumors only when injected into mammary tissue, Dr. Mann said. She pointed out that this was not a transplantation since the number of tumors increased the longer the tissue was frozen. Also, living tumor cells can be grafted on any part of the body and will grow while the virus infects only chest tissue.

The technique used was to mince the tumor tissue removed from cancer-infected mice and then store it in a deep freeze. Refrigeration destroys the tumor cells and liberates the virus. Dr. Mann accounts for this by stating that cold breaks down the inhibiting factor which holds the active virus in check. Moreover, the virus becomes more deadly the longer it is kept in the freezer during the first 48 hours.

GENERAL SCIENCE

New Suits for Amputees

➤ ZIPPER with large rings, buttons attached to a long stem, and pockets that are tacked down and entered at a slant are some of the new features which have been adopted in a special type of suit for amputees.

Dressing has been one of the big stumbling blocks to GI amputees, so the clothing

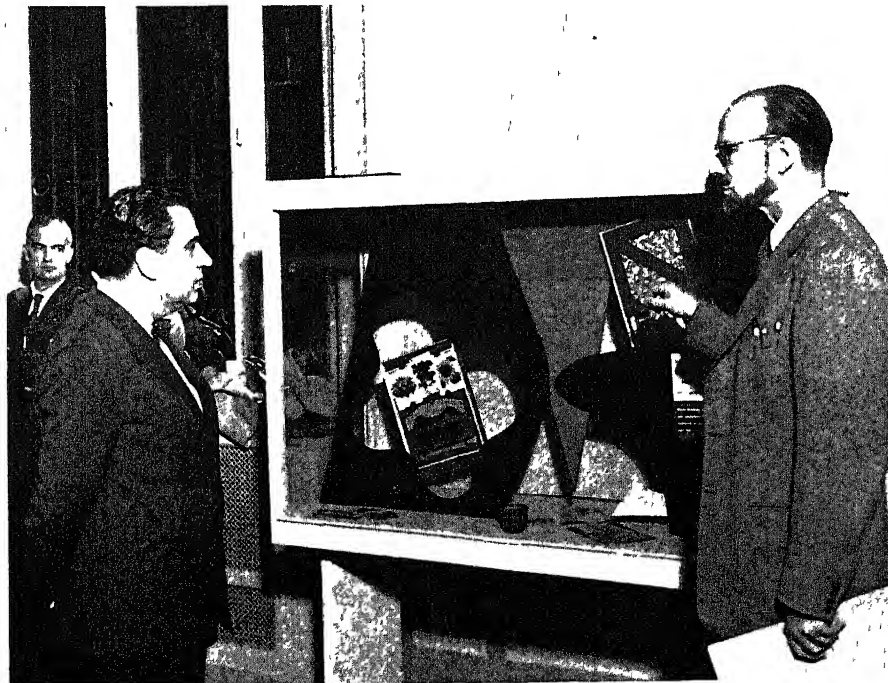
Freezing has little effect on it after this time.

Dr. Mann, with the aid of William J. Dunn, was also able to produce breast cancer by drying the virus after it had been frozen and injecting it into the breast of male and female mice. This experiment was based on the work done by Dr. Mann's husband, Dr. W. E. Gye, director of the Fund.

American cancer authorities questioned in Washington said the evidence that English scientists have successfully isolated cancer virus is "not convincing."

The scientists asked not to be identified as they have not had a chance to fully evaluate the study. But they pointed out that freezing, the method used in the English experiments, has not been accepted in the past as proof of virus isolation.

Science News Letter, August 6, 1949



SCIENCE KITS AT UNESCO—Experimental material on Soilless Gardening developed by Science Service is inspected at the Science Clubs International Exhibit, Paris, by Dr. Jaime Torres Bodet, director general of UNESCO (left), and Dr. Pierre Auger, head of UNESCO's Natural Sciences Department.

branch of the Air Materiel Command's Aero-Medical Laboratory at Wright Field, Dayton, O., designed the new suit at the request of the Veterans' Administration.

The new features are all skillfully concealed and the suits look exactly like the well-draped style at present in vogue. But for the amputee, the new suits have these additional advantages:

For arm amputees the suits have wide shoulders and fuller sleeves to conceal the artificial arm. To prevent wear and tear on the material, invisible reinforcement patches have been added at the elbow and leather reinforcement inside the cuffs. Pockets on the coat are lower and are entered at a slant. They are wide and shallow and taper at the bottom so that the contents fall into one place.

Buttons are on a long stem which can be closed with a specially designed button hook, or they can be attached only as trimming and the coat fastened with a modified slide fastener.

Trousers for leg amputees are fitted with an inner lining reinforcement extending from the pockets to below the knees. Studs are fastened to the inner waistband of the pants that fit sockets on shorts so that both can be removed in one operation.

Additional features include a loop inside cuffs so that sleeves will not be pushed up when an overcoat is put on, and the coat collar is tacked down to prevent it from turning up.

Patterns in the proper sizes for suits with these features can be obtained by amputees from the Veterans' Administration in Washington.

Science News Letter, August 6, 1949

The mineral-containing tropical *manbarklak* wood is so refractory that it dulls ordinary woodworking tools within a few minutes.

ENTOMOLOGY

Spiders' Blood Pressure About Same as Humans'

➤ BLOOD pressure in spiders is about the same as it is in human beings, reports Dr. H. Homann of the University of Goettingen, Goettingen, Germany. But whereas a sudden doubling of blood pressure in a human being would be a most alarming symptom, in spiders it is a perfectly normal event, occurring whenever a spider sheds its old skin and emerges in a new one.

The spiders studied by Dr. Homann found it necessary to shed their skins whenever their weight doubled—ordinarily about four times in a lifetime. He weighed his spiders on a very simple spring scale of his own devising; it consisted of a single slender glass filament which indicated the small weight imposed on it by the degree of bending.

Blood pressure was measured by four different micro-methods equally ingenious. Two of them involved removing one of the spider's eight legs. That, however, did not bother the spider; loss of a leg is a commonplace matter to arachnids, and they grow a replacement by the time the next skin-change is due.

Science News Letter, August 6, 1949

GEOGRAPHY

Newly Named Peak Honors Artist-Photographer

➤ A NEW name has been added to the official map of the West. Jackson Peak, a 13,400-foot mountain in Wyoming's Wind River range. The name was bestowed in honor of the late William Henry Jackson, pioneer artist and photographer of the West.

In 1866, Mr. Jackson made sketches in the Rocky Mountain region, from which notable paintings were later completed. In 1870, he was with the Hayden expedition to the Yellowstone, as official photographer. In 1935, when he was past 90, he painted a series of four panels in the Department of the Interior building.

Science News Letter, August 6, 1949

MATHEMATICS

Millionth of an Inch Measuring Device Needed

➤ IF YOU want to do something big in a small way, here's your chance: develop a device for measuring down to a millionth of an inch or less.

Despite all the instruments scientists have for making ultra-fine measurements, they still need more, declares Dr. Haakon Styri, director of research for SKF Industries, Inc.

"New and better types of gauging equip-

ment to make fast and accurate checks of the finer tolerances toward which industry is constantly advancing are in greater demand now than ever before," he explains.

A few decades ago, accurate measurements down to a ten-thousandth of an inch were considered the ultimate. But today, these measurements are made down to a few millionths, and industry would like to make them even smaller, Dr. Styri says.

Science News Letter, August 6, 1949

BOTANY

English Garden Planned For Blind Visitors

➤ NEW aid to pleasure for the blind is a garden for the sightless in Sunderland, England.

It has special four-inch cuibs to guide the feet of blind visitors along the paths, and metal tags in braille identify the flowers and other plants.

Science News Letter, August 6, 1949

ZOOLOGY-PSYCHOLOGY

Company of Other Dogs Improves Pups' Appetite

➤ PRESENCE of his brothers and sisters around the dinner plate improves the appetite of a puppy.

This was found in tests conducted at the Division of Behavior Studies of the Roscoe B. Jackson Memorial Laboratory, Bar Harbor, Maine.

The amount of food eaten by each of 10 puppies was measured when they ate alone and when they ate with their litter mates all around the same dish. Four of the puppies in one litter were young of a Chow father and Basenji mother. Six were from another litter and the result of a cross between an Irish Terrier and Dachshund.

The Chow-Basenji puppies ate 14% more when they had company than when they were solitary. The Terrier-Dachshunds ate 51% more with company. Company is more important to the appetite of some dogs than of others. The increase of amount eaten for individual dogs varied from 3% to 86%.

No barking, growling or fighting occurred around the family dinner table.

The tests were made at the time of the dogs' regular morning meal of ground boiled horse meat mixed with dog meal, milk, pabulum and vitamins. The food was given to the dogs in a large pan, big enough to provide comfortable access by all the dogs in the litter.

Details of the experiment are reported in the JOURNAL OF GENETIC PSYCHOLOGY (March), by Drs. Sherman Ross and Jean Goodwin Ross, of Bucknell University, Lewisburg, Pa.

Science News Letter, August 6, 1949



ARCHAEOLOGY

"K Ration" of Ancient Greeks Was Pill-Sized

➤ THE K ration of World War II may have seemed a dreary repast to the average GI, but to the soldiers who fought wars from the days of ancient Greece to the sixteenth century it would have been a king's banquet.

Consider the "K ration" developed and prescribed by an ancient Greek army engineer and supply officer, Philon of Byzantium, in the year 150 B. C.

Actually, this "K ration" was a pill about the size of an olive, made up of a mixture of sesame, opium poppy, honey and squill.

The GI of old—and the citizen of besieged cities as well—was allowed one such pill at 8 a. m. and another at 4 p. m. Philon wrote that this diet prevented any "serious suffering from want of food."

An account of the use of the pills is revealed by Dr. Pan S. Codellas, of the University of California Medical School, in the BULLETIN OF THE HISTORY OF MEDICINE.

Dr. Codellas relates that there was an even fancier "K ration" pill recommended by Philon. Almonds were added to the ingredients of the first pill. Philon said this one was "good for airmies, for it is pleasant, filling and does not cause thirst."

Dr. Codellas said the ancient "K ration," which found favor as late as the sixteenth century, packed quite a nutritional wallop. Honey provided carbohydrate, sesame provided protein, the squill was a general tonic, and the opium deadened hunger pains.

Science News Letter, August 6, 1949

WILDLIFE

Study Shows That Deer Are Highly Prolific

➤ ONE explanation of the rapid comeback deer are able to stage when they are given protection and a good range was placed before the meeting of the American Society of Mammalogists in Washington by Dr. Ralph S. Palmer of Vassar College. Twins and triplets are commonplace among them, and a doe may have her first fawn when she is herself only a year old.

Dr. Palmer cited the record of one tame, though unconfined, doe in Maine. She was born in 1934 and had a single fawn in 1936. Kept under observation through 1948, she was known to have borne seven sets of twins and four of triplets, in addition to two other fawns that failed to survive—a total of at least 29 offspring.

Science News Letter, August 6, 1949



ETHNOLOGY

New Version of Iroquois "Constitution" Found

➤ A NEW version of what was perhaps the first "Constitution" of a government in the New World, a sort of Indian Magna Charta, has been traced to its source by Dr. William N. Fenton, Smithsonian Institution ethnologist.

Dr. Fenton studied microfilm of the document in the library of the American Philosophical Society in Philadelphia. The original copy of the document was loaned to the society and has since been returned to its Indian owners on the Grand River Reservation of the Iroquois in Ontario, Canada.

This copy of the "epic of the Iroquois," Dr. Fenton found, is a fairly recent one. It was produced by an educated Mohawk Indian, one Seth Newhouse, about 1885. The Indian ethnologist worked with scientists at the reservation and wrote his version of the document under his Indian name, Dayodekane.

The epic tells of the legendary Iroquois lawgiver, Degandawida, and the wanderings of his disciple, Ayonwhatha, better known as Hiawatha. Degandawida, as founder of the famous five nations of the Iroquois, is credited with developing one of the great original political systems of the world.

Science News Letter, August 6, 1949

NUCLEAR PHYSICS

Static Fighting Device Called Radiation Hazard

➤ A WARNING regarding the proper use of static eliminator devices made of polonium, a highly radioactive metal, has been issued by the Atomic Energy Project at the University of California at Los Angeles.

Dr. Fred Bryan and Louis Silverman of the U. C. L. A. Medical School atomic research group, pointed out that serious radiation hazards may develop in the area around the devices.

Polonium is used in eliminating static electricity produced by belts and pulleys, paper passing over metal rolls and film over metal and plastic rolls. This radioactive metal emits alpha particles to form a conductive layer of ionized air between the dielectric material and a portion of the machine which is grounded.

A survey of certain industrial plants in the Los Angeles area revealed dangerous radioactivity in shelves and closets in which static eliminator devices were stored. Hands of an employee who handled the equipment

were found to be highly contaminated even after repeated washing with soap and water.

The radiation of polonium, Dr. Bryan pointed out, does not penetrate the skin, but an internal hazard may develop from radioactive particles absorbed by inhalation or hand-to-mouth contact.

He recommended that static eliminators be used only when suitable monitoring instruments are available and personnel properly trained to handle radioactive material.

Dr. Bryan declared also that a recently marketed brush, utilizing polonium strips for removing static charges and dust from film and phonograph records, poses a similar problem in homes where it is used.

Science News Letter, August 6, 1949

PLANT PHYSIOLOGY

Temperature Affects Rate Of Plant Killing by 2,4-D

➤ TEMPERATURE has a good deal to do with 2,4-D's effectiveness as a plant killer. Dr. Sally Kelly of the Vassar College botany department sprayed the chemical on leaves of three species of test plants—kidney bean, perennial rye and crab grass—at three temperatures, 41, 59 and 77 degrees Fahrenheit, under greenhouse conditions.

At the highest of these temperatures, results were prompt and definite, but there was a decided lag at the two lower temperature ranges. When plants that had been sprayed at the lower temperatures were moved into the 77-degree room a week later, the killing effect immediately began, even though the leaves had been well washed with water before the transfer was made.

Details of the experiment are given in *PLANT PHYSIOLOGY* (July).

Science News Letter, August 6, 1949

BOTANY

New Strawberry Variety Said To Have "Wild" Taste

➤ IF YOU are one of the legion of strawberry fanciers who yearn nostalgically for the berries of yester-year, "that tasted like something", your deliverance may be even at hand. A new variety of strawberry has just been patented that is stated to have that old-fashioned wild strawberry flavor, with clear red color throughout and no tough, tasteless core.

Advantages are claimed from the grower's viewpoint, too: the fruit stems are strong and upright, making picking easier, and the plant is resistant to leaf spot.

The new variety was originated by the late Harlow Rockhill of Conrad, Iowa, plant patent 854 has therefore been issued to his executor and trustee, Robert A. Rockhill of Marshalltown.

Science News Letter, August 6, 1949

MEDICINE

Anti-Allergy Drugs Are Causing Serious Reactions

➤ EVIDENCE of serious reactions and even one death due to some widely used anti-allergy drugs has been presented in the *JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION* (July 23).

Death resulted in a 16-month-old girl who was poisoned by accidentally swallowing an adult dose of a compound with the trade name of Thenvlene hydrochloride, according to Drs. Hugh F. Rives, Berl B. Ward, and M. L. Hicks of Dubuque, Iowa.

This drug, and the others which gave severe reactions, are antihistaminic compounds used to check the action of histamine, a poison released by body tissues in allergic reactions. There are many on the market widely used for such allergies as hay fever, hives, and skin inflammation caused by reaction to drugs. Some have even been used to treat colds.

Unfavorable reactions occur in from 25% to 65% of the patients treated with antihistaminics, the physicians stated. Reactions are in the form of drowsiness, vomiting, diarrhea, headaches, nervousness, fainting spells, severe prostration and mental upsets.

Irritation of the brain seems to be responsible for these reactions, the report indicates. The physicians add that there is no effective antidote for these drugs. If the patient exhibits toxic reaction to the drugs, their administration should be stopped immediately and the individual symptoms should receive treatment.

Science News Letter, August 6, 1949

ASTRONOMY-ENGINEERING

New Instrument May Give Moon Trip Information

➤ A NEW device to help discover the "kind of things a man on a trip to the moon would need to know" is being developed by scientists at the Armour Research Foundation of the Illinois Institute of Technology in Chicago.

A metal sphere containing scientific instruments and designed to be hauled from a high-speed rocket at an altitude in the neighborhood of 70 miles over the earth was described by Dr. Severin Ravnor. He said that the work on the upper-air research instrument is being supported by the Air Materiel Command, U. S. Air Force.

Heat measuring equipment, cameras to record readings from the equipment, and gyroscopes to stabilize the flight of the sphere, will be inside the new device which is nicknamed "cannonball."

A radio transmitter on the camera will help in tracking its flight to earth when the sphere drops, and a parachute device is planned to enable scientists to get the valuable film record made by camera.

Science News Letter, August 6, 1949

ENGINEERING

Hunt for New Power Sources

Threat of natural fuel exhaustion in the future is spurring scientists to search for new sources of power in atomic energy, solar energy and the tides and winds.

By A. C. MONAHAN

➤ THE future of the present machine age demands new sources of power. There is fuel enough for the needs of today, but all are agreed that the supply of the natural energy-producing fuels may some day be exhausted. This is particularly true for the liquids that power such mobile equipment as automobiles and airplanes.

Scientists are already busily engaged in a search for new fuels and for fuel substitutes. Research is directed toward atomic energy, solar energy and the now-wasted power in tides and winds. There is coal enough to last for many centuries, although the better and more desirable grades may be exhausted much earlier. It is anybody's guess how long man will be able to get crude oil or natural gas from the crust of the earth. Wood will always be available if proper forestry practices are followed.

But it is certain that new sources of power will be needed for future years, and are needed even now so that present fuels can be made to last as long as possible, particularly for specific applications.

Coal Supply

While it is true that the United States has a greater supply of coal than most nations of the world, this fuel can not be used directly to power the 40,000,000 motor vehicles on its highways or the many thousands of planes in the air. These require a mobile source of power, such as is available from liquid or gas-burning internal combustion engines.

These are dependent largely on liquid fuels, mostly petroleum products, although alcohol and other chemicals might be used. It is important that practical methods be developed as rapidly as possible to make liquid fuels from coal, shale oil and tar sands to conserve the underground petroleum which made the automobile age and the air age possible.

Atomic energy has been widely talked about as power for aircraft in the future. Early applications need not be expected. But atomic energy as a source of power for aircraft promises achievements unobtainable with standard fuels, a scientist-engineer working on the problem recently stated.

From results already obtained in reactor development, an atomic scientist recently said, "we should be able to design full-scale reactors, atomic-energy devices, to produce electric power in quantity. It is by no means clear at present how long this will

take, but I believe that it should be within eight or ten years." The statement was by Dr. Robert F. Bacher of the U. S. Atomic Energy Commission.

"The real problem in developing nuclear reactors as a source of energy for the future depends, not upon the availability of raw material, but rather upon the two-stage process of first making this production of energy technically feasible and then trying to make it economically feasible," he stated. "Whether or not it will become economically feasible is the real question. I believe," he added, "that the long-range future for the development of atomic energy is very promising."

Although electricity is primarily for stationary plants, it is widely used in portable machines ranging from household egg-beaters to powerful drills used in mining. These applications, however, require wire connections to powerlines and are usable only within the length of the connecting wire. They are not for mobile units such as the automobile or the aircraft.

Most electrical energy produced in the world today comes from fuel combustion. The other great source is from water power. There is still plenty of undeveloped water power in the United States, and engineers predict large developments within the next generation or so. Some say that the amount available could easily be increased at least tenfold. But, hydroelectric energy can never fill the total of America's power needs.

Electrical Energy

Many of the sites suitable for the development of water power with which to make electricity are entirely unsuitable for industrial activities. The terrain of the land may be responsible, but more often it is the distance from raw materials and markets. Electrical energy, of course, can be transmitted by wire relatively long distances, but the cost of transmission equipment is high, the loss of power is great, and there is a practical distance beyond which transmission is uneconomical.

Direct power from the sun, and power from the tides and wind, are proposed as possible sources for energy little used at the present time. Solar energy seems to hold the greatest present interest. It is widely used now, but it is not the daily energy reaching the earth in the rays of the sun. It is solar energy stored up decades and centuries ago in the wood that is burned, and the sunlight that grew the vegetation

millions of years ago that provides the coal and petroleum of the present.

Waterpower might also be regarded as a source of indirect solar energy. Water in its travel circuit is converted to a vapor on the surface of the earth, lakes and seas largely by the energy of the sun. It drifts in clouds over the land, and the part that falls as precipitation on the highlands is the water available for power. What the scientists are now trying to do is harness the energy of the sun for direct and immediate use.

Solar Energy

There is far more effort being devoted today to the direct utilization of solar energy than is generally appreciated. Present experimental work is largely for house heating, to save other fuels, and to gain experience for later application of sun heat to power plants. By the use of large double glass windows on the south side of a building, interiors are now being kept comfortably warm during sunshine and early evening hours. The problem is how to store up the heat of the sun for use at night and for cloudy winter days. For power applications this captured heat will have to be concentrated.

Scientists at the Massachusetts Institute of Technology are trying several storage systems. In a dwelling completed early this year, water is used for heat storage. In a



SEARCH FOR NEW ENERGY—
This modern windmill near Rutland, Vt., a Smith-Putnam wind turbine, is being studied for possible unused source of power.

dwelling erected even earlier, and now in use, a chemical is used for the purpose. Glauber's salt is satisfactory for the purpose. This is a common substance, a form of sodium sulfate. Storage in iron, marble, concrete and other materials has also been tried.

The house with the sun-heated water is an ordinary one-story building with five rooms, except for its roof structure. The south slope of the roof, with the heat collector, inclines 57 degrees with the horizontal, presenting 400 square feet on which the rays of the sun are received. Their heat passes to a tank of water. When warmed by the sun, the water is pumped to a storage tank, and from there to room radiators as needed.

The principle behind the use of Glauber's salt, or certain other chemicals, makes use of latent heat, or what is now more commonly called heat-of-fusion. It is the heat necessary to convert a substance from a solid to a liquid state, and is not evident in a temperature raise. It takes as many calories of heat, for example, to change ice into water as it does to raise the temperature of the resulting water up to about 175 degrees Fahrenheit.

The system of heat storage in a chemical used in the M I T experimental house is largely the work of Dr. Marie Telkes, of the Institute staff. The chemical is sealed

in containers. There is no loss of the material. Glauber's salt melts at about 90 degrees Fahrenheit. This is low enough to result in liquefying when the rays of the sun are focused on it, even in winter weather. When heat is needed in the house, air from the rooms is circulated about the sealed containers by use of a fan or blower.

The same research that has developed the best types of propellers for airplane propulsion has been applied to windmill blades to capture the greatest possible amount of the energy of the wind. Also blades have been developed to operate when the air movement is very low. Considerable success has been obtained. Windmills of the future may play an important part in generating electricity to supplement energy from waterpower and other sources. The supply delivered will be erratic, depending upon the winds. Wider use of windmills in farm pumping and operating generators to feed storage batteries may be expected.

Tidal power has been used for many years in various parts of the world. It is regular and reliable, but there are relatively few sites where the tides are high enough to produce economical power. The high tides on New England's rocky coast can produce power to drive electric generators. To use them or not is largely a question of economics.

Science News Letter, August 6, 1949

ZOOLOGY

War on African Snail

➤ EVEN before the giant African snails made their recently reported landings on the American west coast, scientists had begun battle against them. The Pacific Science Board has sent two men into the trusteeship area of Micronesia in the mid-Pacific to carry on a four-months' study of their life-history and ecology, as a basis for future campaigns aiming at their elimination. This team consists of Dr. A. R. Mead of the University of Arizona and Dr. Hoshio Kondo of the Bishopp Museum in Honolulu.

A husband-and-wife team, Dr. and Mrs. F. X. Williams, has already been in the East African region that is the snails' natural home, seeking natural enemies that may be introduced into snail-infested areas to carry on biological warfare against them. One of these, a big, hungry black beetle, seemed quite promising at first, but it now appears most likely that the big snail's most effective enemies are two other snail species, both of them fiercely predacious—the leopards of the African snail world.

The huge snails, which attain an overall length of more than seven inches, were carried to all the islands of Micronesia held by the Japanese under the old League of Nations mandate. They were used for food, also chopped up to feed to chickens. Most of the Japs didn't really like them,

however, declares Dr. R. Tucker Abbott, malacologist of the U. S. National Museum. They ate them all right, "but with wry faces," he says.

Their presence in the Hawaiian islands is traced to this food use by Japanese. At least two importations were made by ordinary mail, and the snails kept as penned animals to be killed and eaten as wanted. As soon as the territorial authorities learned about it they swooped down on the snail-pens and tried to make a complete kill. However, some of the creeping mollusks escaped, and Hawaii now has a major snail pest to contend with.

There is nothing in American law or postal regulations to prevent free shipment of any kind of snails. The European edible snail featured by French restaurants, for example, can be shipped without hindrance. It makes American pest fighters uneasy, but unless there is legislation on the subject they can do little to stop the traffic.

There may be colonies of the giant African snails in an unknown number of places in this country because of this situation. One is definitely known about it is maintained by 90-year-old Prof. E. A. Andrews of the Johns Hopkins University, for the purpose of scientific study. He feeds his slow-moving pets on lettuce.

Even if the African pest gets out of hand

in this country it will not be an unlimited calamity. The snails are definitely warm-climate animals, and are exceedingly unlikely to become established where freezing weather is an annual occurrence. But they can do a vast amount of mischief in the warmer parts of the United States.

Science News Letter, August 6, 1949

ENGINEERING

Flywheel Tire Tester Used For Plane Landings Study

➤ A BIGGER and a better flywheel tire tester for use in determining what happens to the tire on a speedy plane when it hits and rolls on the runway, is to be installed at Wright Field, Dayton, O., soon by the U. S. Air Force. It is what might be called a small-space apparatus that eliminates the need for testing by actual plane landings.

The flywheel to be used is seven feet in diameter and three feet wide. It is to be installed in a fixed base and rotated by electric controls at speeds up to 250 miles an hour. Similar equipment already in use has a maximum speed of 200 miles an hour.

In use, the wheel is stationary except for its high speed of rotation. The tire to be tested is mounted on a separate shaft. After the flywheel has reached the desired speed, the tire is moved against it. The tire will get the same initial shock as it would get on a plane in landing on a runway. Slowing down the flywheel speed gives the same effect as a pilot applying the brakes, and the tire gets the same wear.

The flywheel is under construction at the Adamson United Company, Akron, O., and the 150-horsepower electric motor and the necessary controls will be built by Westinghouse Electric Corporation, Pittsburgh, Pa.

Science News Letter, August 6, 1949

AGRICULTURE-CHEMISTRY

Corn Hybrids Differ In Resistance to 2,4-D

➤ THE common weed-killing chemical, 2,4-D, is more injurious to some varieties of hybrid corn than to others, it has been shown by recent experiments conducted at the Iowa Agricultural Experiment Station by Elmer C. Rossman and David W. Stanforth. As the use of 2,4-D increases this may become an important factor to consider in selecting hybrid corn varieties for planting.

Contrary to common popular opinion, 2,4-D may injure corn and other members of the grass family, although in the doses ordinarily used it will not kill them. In the Iowa experiments the 2,4-D caused reductions in the yield of corn, a reduction in the number of brace roots, defective tassel formation, and a larger number of weak seedlings when the grain from the treated corn was planted.

Science News Letter, August 6, 1949

PSYCHOLOGY

Study Minds To Check War

➤ YOU, and what is in your mind, are a part of a new effort to solve the vital, age-old problem of preventing war.

This newest project to combat wars of the future is being undertaken by the United Nations Educational, Scientific and Cultural Organization in Paris. Piloting this UNESCO study of war prevention is an American psychologist, Dr. Otto Klineberg of Columbia University.

If you don't want war, you probably agree with most of the people in the world. But do you ask, "Will war come?" or even "When will war come?"

Dr. Klineberg cautions: "People who are hopeless and apathetic about the future are doing nothing, just waiting for what may come because they feel helpless."

This feeling of helplessness "even affects men in high places who might be able to do something about it," he warns.

"Almost nobody," complains Dr. Klineberg, "is saying, 'Can we do anything to keep war from coming?'"

The psychologist explained that "a lot of science and common sense" is being used by UNESCO to tackle the problem of war. He described the UNESCO war prevention study as a guest of Watson Davis, director of Science Service, on Adventures in Science, heard over the Columbia network.

You are a part of this study because "leaders must have followers" and "people

as well as politicians and generals are important" in war.

"We must know what is in the minds of people as well as the minds of the leaders," emphasizes Dr. Klineberg.

To find out about that, UNESCO is sending specialists in many different fields into different countries to make studies of what it is in the way of life that makes one nation different from another. Scientists from UNESCO are going into small communities in France, India and Australia to study the people in these different nations.

Tourists, Dr. Klineberg believes, can help solve international problems.

"If we could get enough people to travel in other lands," he speculates, "they would understand that other people are different and why they are different, and that in itself might develop friendly relations."

Public opinion surveys of attitudes toward foreigners are being used, and even children are quizzed, by using sentence completion games to reveal their attitudes.

Other studies underway or planned will include legal systems, textbooks, newspapers, magazines and movies.

From this mass of data, scientists will get a better picture of what the people of a nation think of the peoples of other nations. And this, Dr. Klineberg points out, will provide a good start for improving international relations.

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portance) to spare the outlay for spraying machinery and chemicals when spraying will not be necessary (There's no use shooting at an enemy that isn't there).

Of the 15 articles in this final number, eight have to do with plant diseases and their causes, one with an animal malady, two with the newer insect sprays, and one each with molds on wood, seed formation in sorghum, tobacco seedlings and the cooking of potatoes. If there's any boondoggling here it is difficult to detect.

Already letters of protest over the demise of the Journal have begun to roll in, and there is some discussion of the possibility of a resurrection. At best, however, publication could not be resumed for at least another year. And in the meantime there is an empty spot in the national scientific information front, with nothing to fill it.

Science News Letter, August 6, 1949

SAFETY

Highway Safety Group Asks For Vehicle Improvements

➤ CONTINUED improvement in motor vehicle brakes, headlights, driver vision, directional signals, tires, wheel rims and bumpers was urged by the President's Highway Safety Conference. These items are essentials in highway safety, the preliminary Action Program of the conference stated.

Wanted also is the modernization of principal streets and highways. To them should be applied the standards, policies and guides developed by the American Association of State Highway Officials, the U. S. Public Roads Administration and other appropriate agencies. Secondary roads should be improved to standards adequate for safe year-round use.

Other recommendations in the Action Program include the elimination of railway-highway grade crossings on priorities determined on the basis of hazard and economy of operation. Adequate protection should be provided where grade-separation structures are not feasible.

Highways to be safe for year-round travel are best if they have skid-resistant surfaces, smooth, usable shoulders and adequate drainage. With highways used by pedestrians, sidewalks are desirable. Highway lighting is a safety measure on main urban streets and on the more hazardous sections of rural traffic routes.

Science News Letter, August 6, 1949

AGRICULTURE

Suspend Research Journal

➤ ANOTHER casualty produced by an "economy" drive has come to light in the forced suspension of the JOURNAL OF AGRICULTURAL RESEARCH, the last issue of which has just been distributed. The cover bears the terse message: "A shortage of operating funds has forced the discontinuance of this journal. This is the final number."

The JOURNAL OF AGRICULTURAL RESEARCH,

which the U. S. Department of Agriculture has published for a good many years (the current volume is numbered 78), does not get read by many farmers. It is primarily a publication for scientists, but for intensely practical scientists. It might be likened to a military publication that does not get read by anybody but commissioned officers, but which does give majors and colonels and generals indispensable information on how to fight. The information in its undisguisedly technical language eventuates in sprays that kill bugs and check disease fungi, in better ways to plant seed and fertilize the soil, in less wasteful and more profitable methods of getting products to market.

Lead-off article in this swan-song number, for example, is a detailed description of a method for forecasting the likelihood of late-blight disease outbreaks in potatoes and tomatoes, such as scoured the eastern part of the country last year. Application of this method should enable farmers to prepare spraying campaigns when they are likely to be needed, and (of equal im-

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"Adventures in Science" with Watson Davis, director of Science Service, over Columbia Broadcasting System.

Arthur Goldschmidt, special assistant to the Secretary, Department of Interior, will discuss "International Cooperation in Natural Resources."

GENETICS

Politics, Science at Odds

American biologists believe opposing views on Mendelian genetics taken by Soviets represent a conflict between politics and science.

➤ SOVIET science leaders' attack on Mendelian genetics, considered valid in the Western world, "does not represent a controversy of two opposing schools of scientific thought. It is in reality a conflict between politics and science."

This is the declaration of the Governing Board of the American Institute of Biological Sciences, a coordinating organization in which all leading American biological societies participate. The Board's conclusion was reached after consultation with the executive committees of the two societies most directly concerned. The Genetics Society of America and the American Society of Human Genetics. The full statement is published in SCIENCE (July 29).

After reviewing how the official Soviet position was arrived at by methods essentially political rather than by impartial examination of all available facts, the Board comments:

"The progress of science has always depended upon free inquiry. The inheritance of acquired characteristics, and other doctrines that the Russians now set forth as the official party line, have had their proponents in America, some non-geneticists still hold to these ancient opinions. Nevertheless, they are allowed to investigate or philosophize, and they have a hearing."

"In Russia, on the other hand, geneticists are being rooted out as dangerous, bourgeois, reactionary, idealist, fascist, regard-

less of their political views, simply because they, like geneticists everywhere else in the world, know and accept the facts of experimental breeding and microscopic observation which Russian politics has branded false."

"It is of the utmost importance for the preservation of free inquiry in that part of the world where it still exists that these facts be known and fully appreciated."

The statement concludes, with three propositions:

"1. The conclusions of Lysenko and his group regarding the inheritance of adaptive responses in higher organisms have no support in scientific fact."

"2. Genetic researches definitely support the reality of the gene and the validity of Mendel's laws. They do not support the official Communist claim that Mendelian heredity is an illusion, and any attempts on the part of Russian proponents of the Lysenko doctrines to bolster their case by citations from the works or conclusions of Western scientists are gross distortions of the meaning and intent of these scientists."

"3. We condemn the action of the Soviet government in presuming to banish a firmly established science from its schools, publishing houses, and research laboratories, and in persecuting scientists because their field of inquiry is distasteful to the government."

Science News Letter, August 6, 1949

PSYCHOLOGY

Soviet Vision Aids Fail

➤ ANOTHER Russian claim has failed of confirmation in American laboratories.

If you need to see better in the darkness of night, it won't help you a bit, it seems, if you sniff oil of wintergreen, listen to an alarm clock, or do bicycle exercises. Better stick to your red goggles for dark adaptation.

During the war, reports came through from Russian laboratories to the effect that light physical exercise could serve to reduce the time necessary to adapt the eye to darkness from the customary 25 to 45 minutes to only five or six minutes. And that stimulating the other senses—hearing, smell, taste, or the skin senses—would make the dark-adapted eye more sensitive. This was, of course, of great importance to the soldier or sailor in combat.

But details of the Russian research, as reported to the British journal, NATURE,

and other organs available to the Western world, were extremely skimpy. Dr. A. Chapanis, of the Johns Hopkins University, tried to get the information in 1943 through military and diplomatic channels. But his attempts met with no success. In December, 1947, he tried to communicate directly with the Russian scientist who reported the "discovery," Dr. K. Kekcheyev, but the letter was returned unopened from Moscow.

Experiments to test the claim were conducted at the Aero Medical Laboratory, Wright Field, Dayton, O., and are reported in the JOURNAL OF EXPERIMENTAL PSYCHOLOGY (Aug.), by Drs. Chapanis, R. O. Rouse, and Stanley Schachter of Johns Hopkins, Williams College, and the University of Michigan.

Six persons were tested for the length of time necessary to adapt their eyes for dark vision. Two were given oil of wintergreen

to smell. This is an odor used for testing for leaks in oxygen masks and is "rather strong and pungent" but not offensive. They were also timed for dark adaptation without it. Another pair listened to a 1,000-cycle tone of about 50-decibel intensity. They were timed with and without the noise. The third pair were required to ride a bicycle ergometer, which "can best be described as a very light exercise." The tests provided "no evidence that any of the stimuli used either facilitated or inhibited dark adaptation."

In another experiment, the individuals tested tried to read a test chart under dim illumination. Pressure of a heavy weight or a light weight on the back of the hand, or exposure to either a loud sound or a weak one produced no change in the ability of those tested to read the chart.

The third experiment tested ability to make out the form of objects under very dim illumination. The subjects were first dark adapted by use of red goggles. Again, neither an odor, this time of eugenol derived from cloves or cinnamon, the sound of a buzzer, the taste of a slice of lime, nor light exercise squeezing a hand dynamometer, was of any help in making out the shape of the dimly-lighted objects.

Science News Letter, August 6, 1949

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Unreliable Prophets

➤ CRRRRRRRRREEEE-areeee-areeeeeeee! The file-edged song sounds through the heat-drowsy summer afternoon. And Cree-are-areeeeeeee! comes the answer from another tree, and another and another

"Locusts singing," say the weather-wise-aces, "Only six weeks till frost now"

For inaccuracy, that statement comes close to taking the prize. Call it song if you will, that's a matter of taste, more or less. But the singers are not locusts, they are



Working near absolute zero? White potentiometer can help

In the U. of Pitt's cryogenic research, temperatures down as low as 10 K are determined accurately.

Investigator uses a White double potentiometer to measure both current through an L&N resistance thermometer, and voltage across its terminals. Resistance is then computed and translated into temperature.

Catlogs on request.



Jrl Ad E-33-240 (1b)

cicadas, or haivest-flies. Real locusts are big, flying grasshoppers, and these August-afternoon chanters are related to grasshoppers only insofar as they are insects. They belong to an entirely different family, being more closely akin to squash-bugs, giant water-bugs, and the like. They are first cousins of the seventeen-year cicada—also often mis-called a locust.

As for their forecast of first frost, that may be set down to heat-weary wishful thinking. Cicadas sound off just as the summer heat reaches its peak, and the prospect of a good solid chill, even six weeks away, seems to give some relief just through thinking of it. However, it's usually considerably more than six weeks till frost, after you hear your first cicada. The first shrilling of this insect was noted in the vicinity of Washington, D. C., this year about the first of July, and anybody

who expects frost in the Capital's suburbs by mid-August just doesn't know his Washington summers, that's all.

The seventeen-year cicada has been thrust into an equally false role as a prophet because of a peculiar W-shaped marking in the venation of each wing. Superstitious folk who see this insect at most two or three times in their lives take this to be a portent of immediate war.

The joker here is that while the seventeen-year cicada turns up in any given place only once in that many years, there are seventeen swarms or broods of the species, so that somewhere in the country there is a chance to see those W-marked wings every year. But then, this is an unquiet planet, and there is usually some kind of a fight going on, somewhere. So the cicada's reputation is at least partly salvaged.

Science News Letter, August 6, 1949

CHEMISTRY

Improve Leather Tanning

➤ IMPROVEMENT in leather tanning with synthetic chemicals in what is known as the dialdehyde-resin process was recently reported by A. H. Winheim, of the Planetary Chemical Company of Creve Coeur, Mo., and E. E. Doherty of Bona Allen, Inc., Buford, Ga. The process was first announced about a year ago.

In this process, the prepared hide is first treated with a compound of the dialdehyde type, such as the chemical, glyoxal, which is used in making resins, and then with resin-forming agents such as urea or phenol (carbolic acid), or with combinations of these substances and formaldehyde. The rigidity which might result from the process is prevented by the addition of a checking agent.

Investigations recently made eliminate some of the commercial "bugs" in the process, according to Messrs. Winheim and Doherty. Among improvements are the more satisfactory method of acidification of the resin-forming monomers, and the simpler control of flexibility of the leather even when cheap urea-aldehyde resins are employed.

In describing the process, the discoverers stated that the hides are tanned with glyoxal or other dialdehydes, or certain bi-functional compounds. One of the aldehyde groups attaches itself chemically to the protein in the hide, the other remaining free to react with certain resin-forming compounds under suitable conditions.

The proposed and most likely commercially-desirable resin treatment, they continued, involves the use of urea-formaldehyde mixtures or prepolymers slightly deficient in formaldehyde. Employment of a ratio of one-to-five of monoalkyl amine to urea yields leathers of greatly improved flexibility without loss of the highly desired

"fullness" and "firmness" sought by the tanner.

Science News Letter, August 6, 1949

GENERAL SCIENCE

Suggest Way To Improve Clearance Procedures

➤ TWO WAYS in which scientists can help "raise the level of the confidential reports on which clearance decisions are based" were offered.

Scientists who are questioned about neighbors, friends or colleagues should state that they are willing to testify if necessary, and they should prepare a signed, written statement of the information for the investigating agency.

The suggestions were made in a letter to the magazine, *PHYSICS TODAY* (August), by a Princeton astronomer, Dr. Lyman Spitzer, Jr., as chairman of the Scientists' Committee on Loyalty Problems.

Dr. Spitzer explained that information gathered in loyalty and security clearance investigations is collected in a confidential dossier. The sources of the information are often anonymous or known to only a few officials, he points out.

"It is obvious that these unacknowledged statements can cause serious misunderstanding which cannot easily be clarified, especially in cases where the clearance status meets with difficulties," the letter warns.

By following the suggestions, scientists can help this situation, it is proposed.

Members of the Committee which has been studying loyalty and security clearance procedures include Dr. Albert Einstein.

Science News Letter, August 6, 1949

Books of the Week

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THE ARTS AND THEIR INTERRELATIONS—A Survey of the Arts and an Outline of Comparative Aesthetics—Thomas Munio—*Liberal Arts*, 559 p., \$7.50 Attempts an answer to the question "What is Art?"

AN AUSTRALIAN ANIMAL BOOK—Charles Burnett—*Oxford University Press*, 374 p., illus., \$4.50 An account of wild animal life in Australia. There are 17 color plates and 48 pages of pictures taken from photographs. A reference work useful to both the professional man and the layman.

AUTOMOTIVE TRANSPORTATION Trends and Problems—Wilfred Owen—*Brookings Institution*, 154 p., illus., \$2.00 An examination of the cost and quality and an analysis of past trends and possibilities for the future.

BASIC COLLEGE PHYSICS—Henry A. Perkins—*Prentice-Hall*, 605 p., illus., \$6.35 Based largely on the unabridged text of *College Physics*, this is a somewhat shorter and simplified version. Particularly adapted to the needs of the non-technical student.

CORALS OF THE DEVONIAN TRAVELERS GROUP OF MICHIGAN Part I, *Spongophyllum*—George M. Ehlers and Erwin C. Stumm—*University of Michigan Press*, illus., paper, 30 cents.

EXPERIMENTAL PSYCHOLOGY An Introduction—Leo Postman and James P. Egan—*Harcourt*, 520 p., illus., \$4.50 A text for the student who already has some knowledge of general psychology. Outlines for thirty experiments suitable for training in methods of collecting experimental data are included.

FEDERAL INFORMATION CONTROLS IN PEACETIME—Robert E. Summers, Compiler—*H. W. Wilson*, 301 p., \$1.50 Presents the various issues and problems involved. Included is a resume of the facts in the Condon case and FBI loyalty investigation procedure.

GEOLOGY Principles and Processes—William H. Emmons and others—*McGraw-Hill*, 31d ed., 502 p., illus., \$4.50 This edition pays increased attention to the topography of the "tidewater lands," and has many new and improved illustrations. References to source literature are brought completely up to date. A text for the first course in the field.

ION EXCHANGE Theory and Application—Friedrick C. Nachod, Ed.—*Academic*, 411 p., illus., \$8.80 A treatise written by some of the foremost experts in the country covering a large part of the field.

LIFE HISTORIES OF NORTH AMERICAN THRUSHES, KINGLETS, AND THEIR ALLIES—Arthur Cleveland Bent—*Gov't Printing Office*, 454 p., illus., \$1.50 A detailed study of these species and their best known sub-species. The seventeenth of a series on the life history of North American birds.

THE COLLOID CHEMISTRY OF THE SILICATE MINERALS—C. Edmund Marshall—*Academic*, 195 p., illus., \$5.80 Volume one of a series of monographs prepared under the auspices of the American Society of Agronomy.

NEW UNCOILED GASTROPODS FROM THE MIDDLE DEVONIAN OF MICHIGAN AND MANITOBA—Aurele La Rocque—*University of Michigan Press*, illus., paper, 30 cents.

REFLECTIONS ON OUR AGE—Emmanuel Mounier and others—*Columbia University Press*, 346 p., \$4.50 These are the lectures which

formed the background to UNESCO's first conference in 1946. They are written by 22 internationally recognized writers, teachers, philosophers, scientists and others.

REPORT OF THE COMMITTEE ON THE MEASUREMENT OF GEOLOGIC TIME 1947-1948—John Putnam Marble, Chairman—*National Research Council*, 77 p., paper, \$1.00 Includes reviews of the work being done in such countries as Scotland, Spain, and Japan, and an annotated bibliography of articles relating to the measurement of geologic time.

Science News Letter, August 6, 1949

ENTOMOLOGY

Radioactivity Induced in Mosquitoes To Study Habits

➤ NOW it's "hot" mosquitoes. The buzzing, biting pests can be made radioactive, so that their flight and attack habits can be studied even in the dark by the way they make Geiger counters tick.

Technique for doing this was developed by two Army medical researchers, Drs. C. C. Hassett and D. W. Jenkins, at the Army Chemical Center in Maryland. The process is quite simple: you just rear your mosquito larvae in water containing a few parts per million of a suitable radioactive chemical. Drs. Hassett and Jenkins used radioactive sodium phosphate, largely because of the convenient 14.3-day half-life of the isotope, and because radioactive phosphorus is not poisonous.

Details of their experiment are reported in *SCIENCE* (July 29).

Science News Letter, August 6, 1949

ENGINEERING

Silent Engine-Generator Made for Military Uses

➤ ENGINE-GENERATOR set, so quiet that it can scarcely be heard 300 feet away, was revealed by the U. S. Army Engineer Research and Development Laboratories at Fort Belvoir, Va., where it was designed and constructed. Its silence is due largely to a glass-wool-lined box in which it is enclosed.

Noise-making equipment in forward positions in time of war is easily detected and spotted by enemy apparatus. The new engine-generator and its near sound-proof box was developed to meet this situation. On a typical, quiet summer evening, this set has an audible range of 325 feet from the rear, on exhaust side, and 200 feet from the front. The silencer box weighs 93 pounds.

The box itself is of aluminum. Its circuitous air intake and exhaust ducts are lined with one inch of glass fiber cemented

to the walls. The interior of the box has a two-inch lining of the same material. Ventilation is assured by the design of the ducts. All the air entering the box is dispelled over the cooling fins of the engine. There is no air recirculation, and the efficiency of the unit is not measurably affected by the housing. The generator used is a 1.5 kilowatt unit.

Science News Letter, August 6, 1949

Words in Science— TURBOJET-TURBOPROP

➤ MANY of the fast planes of today and tomorrow are or will be powered by turbojet or turboprops or both.

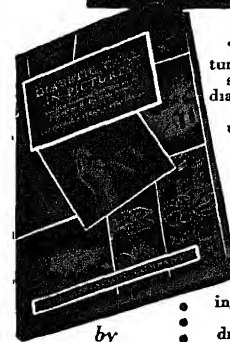
In the turbojet engine compressed air is forced into combustion chambers. There fuel is added, usually kerosene. It burns, creating high-pressure gases, some of which operate the compressor to supply air for burning but most of which pass out the jet exhaust, giving the propulsion.

The turboprop is a somewhat similar device but all the gases created are used to expand through vanes or buckets on a shaft and give high rotation to the shaft, which in turn drive conventional propellers.

Science News Letter, August 6, 1949

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DIABETICS



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❄️ **PICNIC BASKET** will keep a supply of bottled drinks, salad, and dairy products chilled for hours, or can be used to keep hot foods at almost oven temperature. It is made of glass fiber insulation sealed in plastic. It is 10-quint size, and the plastic is resistant to food stains and marks of outdoor use.

Science News Letter, August 6, 1949

❄️ **MOTH-REPELLING** coating for storage space walls comes in a powder which, in use, is mixed with water to form a paste, and is applied with a paint brush to form a layer as thick as a penny. It dries in an hour and is relatively permanent. It is made of ingredients of the cedar tree and a powdered plastic binder.

Science News Letter, August 6, 1949

❄️ **FOLDING S.WHORSE**, recently patented, has four pivoted legs that fold under the top and side rails of the device when not in use. The side rails, on rigid brackets, slope downward and outward, thus giving the legs pivoted to them the proper spread when the horse is unfolded for use.

Science News Letter, August 6, 1949

❄️ **OIL DRAINER** for the automobile removes the oil and sludge by means of an injector tube inserted into the oil-filling



opening, thus eliminating the commonly used method of draining the tank from under the car. The 20-pound portable device, shown in the picture, works on ordinary air pressure.

Science News Letter, August 6, 1949

❄️ **GOLF PUTTER** has the ordinary head but it is formed with two leg-like parts,

one on each end, that keeps the striking part away from the ground so that the ball is struck above its vertical center. This recently patented device makes the ball hug the green as it approaches the hole.

Science News Letter, August 6, 1949

❄️ **DISH-WASHING** aprons for men are made of plastic and never need laundering because they can be easily cleaned with a damp cloth. They are available in a variety of humorous designs such as "Little Butch" and "My Achin' Bacon."

Science News Letter, August 6, 1949

❄️ **ELECTRONIC** safety starter, that eliminates the danger of transformer burn-outs in fluorescent lamp fixtures, is a highly intricate thermal relay that automatically switches off the current if the lamp is defective and does not light in 30 seconds.

Science News Letter, August 6, 1949

❄️ **COAL-DUST EXPLOSION** gallery, small and portable and designed to show how a cloud of coal dust will explode if ignited by a spark of flame, can also be used to demonstrate the hazard of dust in industrial plants from flour, cocoa, sawdust and other materials. It utilizes electricity to explode the dust in a 10-inch-long transparent plastic tube.

Science News Letter, August 6, 1949

Do You Know?

Of approximately 800 tree species native to the United States, only about 90 attain commercial size and quality.

A massive German-built concrete U-boat shelter in Norway is now used as a factory; windows had to be cut through its 10-foot-thick bomb-proof walls.

Arthur Pitney is credited with originating the stamping machines now widely used in business offices which save the use of ordinary postage stamps.

The American paddlefish, rare but found in Midwestern rivers, has a spatulated snout about one-third of its total length, and it gathers food by swimming up stream with its big mouth open to gather in microscopic animals and plants.

A new office building in Boston has 16 electric moving stairways, two between each floor to carry passengers up or down, the unique feature is that they can all be operated to carry passengers in the same direction during rush hours.

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13th FEB 1949 AUGUST 13, 1949

SCIENCE NEWS LETTER



THE WEEKLY SUMMARY OF CURRENT SCIENCE



Livingston Library.
Imperial Agricultural Research Institute
New Delhi.

"Hot" Hornet

See Page 98

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VOL. 56 NO. 7 PAGES 97-112

MEDICINE

High Blood Pressure Aid

Malarial parasites have proved effective in reducing elevated blood pressure. The malaria can then be cured within a few days with drugs.

➤ **DISCOVERY** that malarial parasites have the ability to reduce high blood pressure was reported by Dr. Eusebio Y. Garcia of the Medical Research Clinic in Binan, Laguna, Philippines.

He gave four high blood pressure patients injections of the commonest and mildest species of malarial parasites, which resulted in a fall in their high blood pressure, Dr. Garcia told a meeting of the Philippine Society of Parasitology.

It is believed, he said, that about 90% of high blood pressure diseases originate in the kidneys. Some changes in the body cause the blood flow to the kidneys to be reduced, which starts the secretion and storage of renin, an enzyme of protein nature. When this is liberated in the blood stream it reacts with a substance in the blood to elevate the blood pressure.

Malarial parasites appear to have the

power to counteract this chain of events by increasing the blood-flow to the kidneys which was previously deficient and so reduce the secretion and storage of renin. Moreover, the parasites destroy a certain amount of red blood cells. This makes the body react in such a way that an inhibitor of the high blood pressure substance is released. Another way the parasites might accomplish reduced high blood pressure is by promoting congestion in the brain.

The malaria is induced by injecting the blood from a malaria-infected patient which is the non-relapsing form. It can be cured within a day and a half to four days by any of the standard drugs to combat this disease.

These results are not final, Dr. Garcia said, until further experiments can show that the effect is permanent.

Science News Letter, August 13, 1949

NUCLEAR PHYSICS

Hornets As Leak Detectors

See Front Cover

➤ "HOT" hornets—in the radioactive sense, not just with their stingers—promise to be useful in the safety program of the Atomic Energy Commission. The potential helpfulness to man of these energetic but not-too-popular insects is disclosed in the semi-annual report of the AEC.

One curious but until now apparently useless fact of natural history was the knowledge that the common white-faced hornet accumulates the element barium in its body. Barium, a chemical relative of the more familiar and abundant calcium (lune) is widely distributed in nature. It is also one of the lighter elements formed in the radioactive breakdown of the heaviest natural element, uranium, the atom-bomb metal.

Researchers on military and peaceful uses of uranium naturally do not want escaping atomic fragments stewing the countryside with dangerous pollution. So it is proposed to encourage colonies of hornets to live in the neighborhood of nuclear-fission laboratories, and to seek their food among plants exposed to possible radioactive leaks. From time to time some of them will be captured, killed and analyzed. If they assay too high in barium, there's a "hot" leak somewhere, that has to be found and stopped.

On this week's cover of the SCIENCE NEWS LETTER a hornet is shown getting her meal of barium.

Description of various safety measures used in atomic energy laboratories and power plants occupies a substantial part of the AEC report. Because they know how dangerous is the stuff with which they are dealing, scientists and other workers around the laboratories normally take elaborate precautions against exposure, and the number of casualties to date has been gratifyingly small.

One new development, not yet in use, has been the finding of a new, re-usable coolant for the atomic piles, to replace the water- and air-cooling systems hitherto employed. This is expected to simplify the coolant-disposal problem.

Science News Letter, August 13, 1949

ACCOUNTING

Atom Forces Uncle Sam to Modernize Bookkeeping

➤ **INSTEAD** of keeping his eye merely on the money coming in and going out of the public treasury, Uncle Sam from now on can tell definitely how much money he will have to save to replace piping for uranium hexafluoride, or what the cost is per millicurie of invisible radiation.

Modern industrial accounting methods are entering Uncle Sam's bookkeeping system for the first time. Atomic energy and fissionable materials have succeeded in disintegrating the Government's antiquated cash basis accounting. They have replaced it with accrual bookkeeping and cost accounting, so far as the major industrial companies contracting with the Atomic Energy Commission are concerned.

The accounting systems of the Commission and its contractors have been so coordinated that the balance sheet of each company can be entered in the super-ledgers of the Atomic Energy Commission.

"Taken together," says the Commission in its Sixth Semi-Annual Report, "the books of account kept by the Commission and its contractors will show the assets, liabilities, net worth, and financial results of operation of the entire atomic energy program."

Science News Letter, August 13, 1949

CHEMISTRY

Photographic Wash Water Is Reusable by New Treatment

➤ **THE** same old batch of wash water used in Army field photographic laboratories may be used over and over again by a method of purification developed by the Signal Corps at Fort Monmouth, N. J. The process is particularly of value in advanced and isolated positions where fresh water is unavailable.

In a typical field laboratory approximately 3,000 gallons of fresh water are needed in a 24-hour period. With the new development, a supply of about 10 gallons is sufficient if purified and reused many times. The process is based on a principle of water purification used during the past decade or so known as ion exchange. It is used by industry to soften water fed to large boilers, and was used by the Navy during the war to produce drinking water from the ocean brine.

In the Signal Corps process, the water, after use in washing photographs, is passed over thousands of tiny particles of synthetic resin. These filter out and recapture silver and other impurities acquired by the water in the washing procedure. The water, stored in a tank located in the mobile laboratory, is pumped to a print washer where it removes hypo from the prints, circulates back to the resins, and is then in condition for reuse.

The synthetic resins used are virtually indestructible and can be rejuvenated by the simple process of immersing them in either battery acid or washing soda, depending upon the particular type of resin.

While this Signal Corps process is suitable to purify water for reuse for washing photograph prints, it cannot be used to purify water for drinking purposes because the resins are ineffective in killing bacteria or lower forms of organisms.

Science News Letter, August 13, 1949

AGRICULTURE

Carbon Aids Soil-Heating

The natural gas derivative, carbon black, has been found to help the soil absorb more heat from the sun. This finding may help farmers in their planting.

➤ CARBON black, the powdered material obtained from natural gas and used to toughen automobile tires, has been successfully used at the Massachusetts Agricultural Experiment Station, Amherst, to raise soil temperature, according to a report in INDUSTRIAL AND ENGINEERING CHEMISTRY, publication of the American Chemical Society.

Soil containing the carbon black absorbs more heat from the sun than ordinary soil. In the experimental work, carbon black at the rate of two tons per acre was mixed in the top two-inch layer of a sandy-loam. With an instrument called a potentiometer, surface and near-surface temperatures were recorded every 15 minutes, 24 hours a day, for more than a year.

During the spring and summer months, it was found, maximum daily temperatures reached by the carbon-treated soil surfaces were higher on an average by about two degrees Fahrenheit than maximum temperatures of untreated soil surfaces in adjacent plots of the same type of soil. At a two-inch depth, the carbon-treated soil

showed maximum daily temperatures about 3.4 degrees higher than those of the untreated soil.

Further tests are being made both at Amherst and at other agricultural institutions throughout the country. If an economically feasible process can be worked out, farmers may be able to defrost their land for earlier planting in the spring, and at the same time postpone the first fall frost and thus give late crops more time to mature.

The cost is not excessive. Carbon black runs from 35 to seven cents a pound. A single treatment should suffice for a number of years even though some loss from erosion may occur. There is no evidence that the carbon black acts as a plant nutrient or is digested by plant roots. Whatever influence it exerts on plant growth is attributed to its effects on soil temperature, as well as on the texture, salt retention and moisture retention of soils.

The experiment of the Massachusetts station was carried out by Prof. John Everson of the University of Massachusetts and

James B. Weaver of Godfrey L. Cabot, Inc., Boston, a manufacturer of carbon black.

Science News Letter, August 13, 1949

INVENTION

Concentration Process for Uranium Given AEC

➤ A NEW process for the concentration of uranium out of its ores has just been disclosed via the issuance of U. S. patent 2,477,924 to Sherman M. Fried of Chicago and Norman R. Davidson of Sierra Madre, Calif. They have assigned their patent rights to the government, as represented by the Atomic Energy Commission.

The new process covers just one step in the concentration of uranium oxides, from uranyl uranate (U_3O_8) to uranium trioxide (UO_3). Essentially, it consists in heating the lower oxide in the presence of oxygen under pressure. Extent of conversion and time required vary according to temperatures and pressures employed. Time may be cut to as little as one and one-half or two hours by using pressures of from 60 to 150 atmospheres at a temperature between 700 and 750 degrees Centigrade.

Science News Letter, August 13, 1949

AERONAUTICS

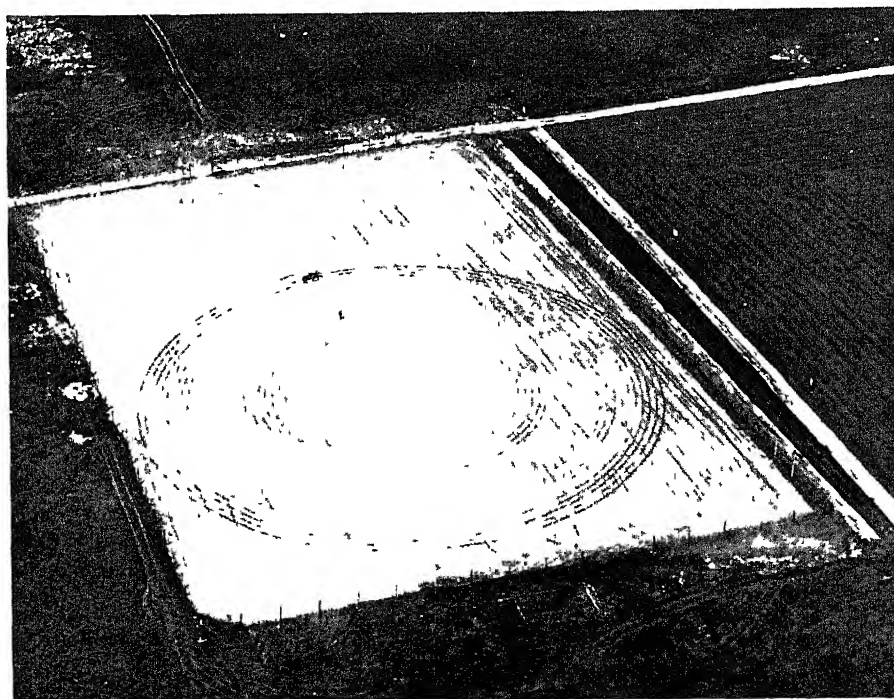
Pre-Flight Training in High Schools Increased

➤ SOME 100,000 cadets of high school age are to be enrolled in pre-flight training this fall, Civil Air Patrol has revealed. Already 23,000 boys and 7,000 girls have enrolled in the program which is given in secondary schools throughout the nation. The experimental stage has now been passed, and credit toward diplomas is being given the students for their study of air science.

The ultimate aim of this educational program is to create a continuing body of air cadets whose interest in aviation will carry them into the aircraft industry as scientists, executives, mechanical and maintenance experts, and as navigators and pilots. They are receiving instructions in class rooms after school hours, in club quarters of the Civil Air Patrol and at nearby air bases. Classes are held once a week. Instructors are, in general, local volunteer members of the Civil Air Patrol.

The Civil Air Patrol is an official auxiliary of the U. S. Air Forces, and is ready at all times to go into prompt service in emergencies such as search and rescue work. Thousands of hours were flown by CAP pilots last winter during the blizzard in the West that made feeding isolated people and cattle necessary. This is but one of many aviation jobs for which their services may be required. Many of the members of the CAP are reserve pilots in the U. S. Air Force.

Science News Letter, August 13, 1949



RADIATION'S EFFECT ON GROWING PLANTS—Rows of crops are planted at varying distances from a source of radiation in the form of radiocobalt which will be placed on the pole in the center of this experimental area to help scientists determine the effect on plants.

GENERAL SCIENCE

Private Lives Invaded

Leading scientists on AEC committee protest FBI clearance for Atomic Energy Commission fellowship holders as "federal interference with private lives of citizens."

► **STRONG** disapproval of the requirement that all holders of AEC fellowships be cleared by an FBI investigation is expressed by the nine members of the Atomic Energy Commission's general advisory committee headed by Dr. J. Robert Oppenheimer, director of the Institute for Advanced Study. Partial text of the statement follows:

Admittedly, the tensions of the times and the secret nature of the atomic energy work require elaborate checks for all who have access to classified material. But to carry over the same security concepts to holders of fellowships who will in no way have access to secret or confidential information seems to us both unwise and unnecessary.

It is clear that these requirements of FBI investigation of prospective holders of AEC fellowships would be to extend still further the area of federal interference with the private lives of citizens. We use the word "interference" advisedly, for it is evident that the type of questioning of friends, relatives, and acquaintances required by the investigative procedures of the FBI do constitute an encroachment on the private affairs of many people.

To repeat, we grant this to be necessary in these times in those cases where persons are to be employed on secret government matters. But we are horrified by the prospects of moving this whole semi-police apparatus into the realm of youth. We believe that the reputation of many young people of the country might be adversely impaired by rumors growing out of such a system of investigation of prospective fellowship holders.

Older people can see in proper perspective calls from FBI agents; they can answer questions about acquaintances without feeling that the man being investigated is under suspicion. But young people of university age are likely to react quite differently. An atmosphere of suspicion and uncertainty is likely to be generated by the activities of federal agents among many groups of friends in colleges, universities, and in local communities.

In short, the results of requiring investigations of candidates of fellowships will have serious repercussions throughout the country.

Against the evil effects which we believe will probably follow the adoption of the proposals for FBI clearance of AEC fellows, let us place the possible gains. Let us admit that without such clearance an occasional clandestine member of the Communist party might receive a fellowship. But even the proponents of the proposals do not contend that security will be thereby endangered, for the holder of the fellowship has no privileges in regard to classified information.

If after completing his studies the fellow wishes to work for the government he will be subjected quite properly to a thorough check which will reveal his affiliations if he is a Communist and he will be rejected. At the worst the government will have then spent its money on a man who can not be used for the furtherance of the national security.

But leaving aside the question of cost to the government, we submit the risk that a very few Communists may receive training though an open and uninvestigated

fellowship program represents a negligible loss, as compared to the bad effects on the spirit of our nation which would result from a further extension of counter-espionage methods to those of college age.

Besides Dr. Oppenheimer, the committee consists of Dr. Oliver E. Buckley, President, Bell Telephone Laboratories; Dr. James B. Conant, President, Harvard University; Dr. Lee A. DuBridge, President, California Institute of Technology; Dr. Enrico Fermi, Professor of Physics, Institute for Nuclear Studies, University of Chicago; Dr. I. I. Rabi, Chairman, Department of Physics, Columbia University; Hartley Rowe, Vice President and Chief Engineer, United Fruit Company; Dr. Glenn T. Seaborg, Professor of Chemistry, University of California; Dr. Cyril S. Smith, Director, Institute for the Study of Metals, University of Chicago.

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NUCLEAR PHYSICS-MEDICINE

Atom Age Hypo Syringes

Lead-enclosed syringes are protecting scientists from harmful radiation to which they are exposed while treating patients.

➤ **HYPODERMIC** syringes for the atomic age are getting coatings of lucite and even lead

Exposure to radioactive chemicals day after day can cause serious injury and shorten life. Patients getting the chemicals for treatment do not get the daily, life-long exposures. But X-ray and radium specialists who give the treatments might. And because such chemicals are being used more and more, there is increasing danger to the specialists giving the treatment or using them in the search for better methods of treating disease.

Radiogallium, one of the newer radioactive chemicals under study for its possible use in bone diseases, gives off such strong gamma rays that dense lead shielding of the hypodermic syringe proved necessary to protect the scientist studying it.

Shields of this type, for standard hypodermic syringes from very small ones an inch and a half long to big jobs measuring almost seven inches and holding about an ounce of fluid, have been designed by scientists at the Naval Medical Research Institute at Bethesda, Md. The lead-shielded syringes are a little awkward to handle, since they weigh about four and one-half pounds and are very much larger than the ordinary glass syringes. At the Naval Hospital where they have already been used for injections in patients, doctors avoid the difficulty by first inserting in the vein a

hypodermic needle attached to a rubber tube used for giving salt or sugar solution. The needle of the lead-shielded syringe is then inserted into the rubber tubing.

A slot milled in the lead shield lets the doctor see the level of fluid as he draws it up into the syringe and whether there are air bubbles in it. A dark-colored solution of the radioactive chemical makes it easier to see the fluid level, bubbles and so on, and for the same reason the inside surface of the shield is coated either with a phosphor activated by radioactive emanations or with some luminous dial paint.

The lead shielding cuts the amount of rays reaching the doctor to well below the amount considered a safe daily dose.

For radioactive chemicals that emit alpha and beta rays instead of gamma rays, a two-piece shield of the plastic, lucite, gives enough protection to the hands of the doctors. These chemicals include two kinds of carbon, iron, phosphorus, sulfur, copper and strontium.

Details of the shield designs are reported in the journal, *SCIENCE* (July 1), by Comdr. H. C. Dudley, J. F. Bronson and R. O. Taylor of the National Naval Medical Center. The shields are not yet on the market. Comdr. Dudley and associates have applied for a government patent and will make the design public property so that any manufacturer can make them.

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accounting system is unique, yet they have succeeded in devising a unified system applicable to all industrial organizations contracting with them on atomic energy research.

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CHEMISTRY-ENTOMOLOGY

Outmoded Phonograph Helps in Testing Insecticides

➤ **EVEN** though your family may have long ago discarded that old style phonograph, the one which played wax cylinder records, the U. S. Department of Agriculture is putting this out-of-date instrument to good use, in money-saving tests of insecticides.

Replacing the record holder of the phonograph with a screen cage, the Department scientists place a white mouse in the cage, turn the crank several times, and give the mouse a shower bath as it is rolled over and over. The shower is not of water, however, but a sprayed insecticide solution. The entomologists use this device in searching for a chemical which will prove effective in



LEAD-SHIELDED SYRINGE—Comdr. H. C. Dudley of the Naval Medical Research Institute fills a lead-shielded standard hypodermic syringe with a radioactive chemical solution. In front of the lead-guarded container is an ordinary hypodermic syringe of about the same capacity, one-third of an ounce, as that he is filling. The syringe at left on the tray is shielded in lucite. The tube showing inside his glove is an electroscope for detecting the amount of radiation getting to his hands and body.

NUCLEAR PHYSICS

AEC Inventories Atoms

➤ **INVENTORY** problems involving uranium 235, it is suggested by the Sixth Semi-Annual Report of the Atomic Energy Commission, just released, are by no means as simple as those faced by King Midas of the golden touch.

The legendary king, who transformed all his surroundings, including his courtiers and his young daughter, into gold, had only to store his wealth in a vault and keep track of the tonnage on hand.

Present day alchemists have their assay problems infinitely complicated by the fact that they cannot lock up their treasure until they are ready to use it. Their trouble is not in changing one heavy metal into another. That process goes on spontaneously. Their difficulty comes in determining how much of which metal is in any one container at what moment.

Their material is not only in constant

state of change, but it is accompanied by radiation in deadly quantities and end-products that are fantastically poisonous. It is often impossible to get close enough to the material to assay it at all.

The Atomic Energy Commission announces in its report completion of the first part of its program to account for stocks of radioactive material in its modernized bookkeeping system. Perpetual inventories of such materials have been established, even though the materials themselves are far from permanent.

If a banker had to keep accounts in a world where gold dollars in his vaults slowly changed into copper pennies, and some of his coins were in liquid and gaseous form, as well as metal, he would understand better the problems of cost accounting among the atoms. The Atomic Energy Commission points out that their

the control of stable flies and other blood-sucking flies and mosquitoes

After the shower bath, while still tumbling in the cage, the mouse is blown dry by air. The next day the mouse is caged with 20 stable flies. If as many as four of the flies succeed in attacking the mouse, without being poisoned or driven off, the insecticide is considered worthless, and full scale tests on cattle or other livestock are unnecessary.

Hundreds of chemicals, both new synthetics and modifications of well-known older insecticides, are being tested in this manner to find those that will kill or repel the harmful insects, yet will not harm the

animals. Experience has shown that the farmer is amply repaid for the cost of the insecticide in the increased milk production and weight gains of cows which are protected from stable flies and other pests.

The preliminary test of the insecticide on white mice not only demonstrates the effectiveness of the chemical but it is much cheaper to perform, requires a significantly smaller amount of material, and results are obtained more quickly than in full-scale tests. If the tests prove the insecticide to be effective for white mice, full scale investigations of the formulations are made on cattle, horses, and other livestock.

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PSYCHOLOGY

Suggest Way to Survival

➤ A SCIENTIST who is worried that we may destroy ourselves has come up with some rules for effective living—and the survival of man.

Dr. Kenneth E. Appel of the University of Pennsylvania Medical School warned that the crime waves, alcoholism, mental illness and increasing divorce rates may be pointing the way to man's destruction. But there is hope if we learn to live with others.

The scientist discussed the future of man as a guest of Watson Davis, director of Science Service, on *Adventures in Science*, heard over the Columbia network.

Here are Dr. Appel's rules for effective living:

"Don't aim for happiness alone, or even make it your chief objective. The mature individual does not strive always for happiness. There is a higher contentment and peace of mind that may involve unhappiness, effort and even suffering that can be assimilated by the mature mind. There are stakes, goals, rewards and values in the struggle of life that are higher than individual happiness or comfort.

"Don't shirk work. Do something worthwhile. Pull your load unless you are sick. Many people have been deprived of one of the basic satisfactions of life, because

circumstances have prevented them from cultivating the habit of effort and achievement, however humble.

"And do things that need to be done or have to be done by somebody, regardless of your immediate feelings.

"Get along and cooperate with others. Work in an organization. You must learn to work for a time even under unfair and unpleasant authority. Stand for frustration, failure, mistakes, disappointment and always carry on—whether the frustration be of your ambition or in your personal relationship with others.

"Take responsibility. Show independent initiative. Be self-decisive, self-moving, self-directing.

"Absorb frustration and failure without developing handicapping, disintegrating tensions of fear, anger, depression, suspicion, blaming others, withdrawal, or undue bodily disturbances associated with intense emotion.

"And you should show devotion, effort, and love to something beyond yourself. Such are the qualities of emotional, mental or personality health that we all—fathers, mothers, children, society—have to cultivate. And it is possible for all of us continually to improve our capacities in these regards.

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ASTRONOMY

Nebulous Star Groups?

➤ RED LINES discovered in spectrograms made at Mexico's National Astrophysical Observatory at Tonanzintla may help settle an astronomic puzzler.

The red lines, made in the spectrum of faint nebulous objects in the famed Andromeda nebula, indicate the presence of hydrogen. And the hydrogen indicates that the objects may be planetary nebulae or nebulous star groups like the Pleiades, but not globular clusters, as has previously been

suggested by some astronomers.

The new spectrograms were made with the wide-eyed Schmidt telescope at Tonanzintla which boasts the largest prism in the world, 26 inches in diameter. Dr. Guillermo Haro, director of the Mexican National Astronomical Observatory at Tacubaya and a member of the research staff at Tonanzintla, made the discovery, which was reported in a communication to Dr. Harlow Shapley, director of the Harvard

College Observatory, from Dr. Luis Enrique Erio, director of the Tonanzintla Observatory.

"The new result from Mexico shows definitely that at least some of the objects are not typical globular clusters," Dr. Shapley commented.

Two astronomers, Drs. Edwin P. Hubble and Walter Baade, both of Mount Wilson Observatory, had tentatively speculated that the objects were globular clusters.

Science News Letter, August 13, 1949

ENGINEERING-CHEMISTRY

Add Nothing to Paints Is Advice of Expert

➤ ADDING a little of this and a little of that to modern household paints may entirely change their characteristics, the amateur painter was warned by E. D. Peck of the Pittsburgh Plate Glass Company.

The numerous superior paints that have been developed since the end of the war are in specialized categories of composition, performance and application, he said. Synthetic resins and specially processed oils now used by practically all paint manufacturers are not always compatible with the old-time ingredients of mix-your-own-paint days.

All paint makers print concise directions for the use of their products on the labels of the containers. These instructions should be carefully followed to give the best results.

Science News Letter, August 13, 1949

CHEMISTRY

Wood Waste Is Source Of Sugary Chemicals

➤ CHEMICAL wealth is extracted from wood waste in a new way by a process on which U. S. patent 2,465,347 has just been granted to Robert M. Boehm of Laurel, Miss., and Horace E. Hall of Lyle, Tenn. Rights have been assigned to the Masonite Corporation, large user of wood chips in the making of wallboard.

When wood chips are subjected to high steam pressure, as in the preparation of wallboard fiber, the liquid that runs out contains in solution considerable quantities of what are known as sugar precursors—substances from which industrially useful sugars can be prepared by chemical treatment. To separate these from the tannins, acids and other undesired substances that are also in solution, a mixture of about four parts of acetone and one part isopropyl ether is added. This converts the sugar precursors into insoluble forms, which come down as precipitates in a relatively high state of purity, leaving the undesired substances still in the watery solution which can be poured or filtered off.

Science News Letter, August 13, 1949

MEDICINE

Assign Rheumatism Drug

Cortisone distribution to institutions has been put in the hands of a committee of the National Academy of Sciences to speed investigation.

➤ SCARCE supplies of the dramatically effective drug, Cortisone or Compound E, for treating rheumatoid arthritis, will be allotted by a committee of the National Academy of Sciences, under the chairmanship of Dr. Chester S. Keefer of Boston, who during the war also was "czar" of civilian penicillin and streptomycin distribution.

The small amount of the new drug available during the remaining months of this year will be used for clinical and investigational purposes to provide information vitally needed to insure its safe and effective use.

The value of Cortisone in controlling the symptoms of this painfully crippling disease is "regarded as established," the announcement of Dr. A. N. Richards, Academy president, states, but "much remains to be learned concerning its possible untoward effects, its usefulness in other diseases and the mechanism of its action."

For that reason the Research Corporation, which administers the patents on the new drug, turned to the National Academy and pledged itself to accept the recommendations of the Academy committee as final authority in distributing all of this year's supply of Cortisone.

Applications for a supply of Cortisone must be submitted on a form that can be obtained from Dr. Keefer at 2101 Constitution Ave., Washington, D. C., but he will consider only requests from institutions with adequate facilities for investigation and clinical control.

Some of the new drug will be used in diseases other than rheumatism experimentally if the investigators believe that the usefulness of the new treatment can be extended.

The Academy committee, which will use the facilities of the National Research Council for its work, consists of Dr. Keefer as chairman and Dr. Hans T. Clarke of the College of Physicians and Surgeons, New York, Dr. E. A. Doisy, St. Louis University School of Medicine, Dr. Robert F. Loeb, of the College of Physicians and Surgeons, New York, Dr. C. N. H. Long, Yale University School of Medicine, Dr. E. K. Marshall, Jr., of the Johns Hopkins University School of Medicine, and Dr. Joseph T. Wearne of Lakeside Hospital, Cleveland, with Dr. David E. Price of the U. S. Public Health Service as liaison with that governmental agency.

Cortisone, (originally known as Compound E, which name was abandoned because of confusion with vitamin E) is a

complex chemical that was originally obtained from the cortex of the adrenal gland. It is now being prepared synthetically from a bile acid. It was isolated by Dr. E. C. Kendall of the Mayo Clinic. Dr. Philip S. Hench of the Mayo Clinic headed the group that pioneered its clinical use just a few months ago. Meick and Co. chemists participated in the biochemical investigations that resulted in its partial synthesis. The full scientific name of Cortisone is 17-hydroxy-11 dehydrocorticosterone.

Science News Letter, August 13, 1949

PSYCHOLOGY

Infants' Sleeping Habits Charted Under New Grant

➤ WHETHER the sleep of the innocent is untroubled or not is a problem scientists are going to tackle. Infants between six and 26 weeks old will have their sleeping habits charted under a \$10,000 grant made for this purpose to the department of physiology at the University of Chicago by Swift and Company.

One phase of the study will cover the diet and its effect on infants' sleeping habits. Researchers intend to add 25% protein in the form of specially prepared meats to the feeding formula of the babies.

The sleeping pattern of these infants will be recorded by a special device attached to the crib.

Science News Letter, August 13, 1949

MEDICINE

Advice for Next Winter: Avoid Snow on Frostbite

➤ MOP off your brow, pull up a cold drink and listen to the latest medical advice: "Don't rub snow on frostbite."

This untimely (south of the Arctic) warning was published in the YALE JOURNAL OF BIOLOGY AND MEDICINE. If you can remember it next winter, though, it may be mighty important.

The old practice of putting snow or cold water on frostbitten portions of the body may cause gangrene, not prevent it. This has been discovered in experiments conducted by Drs. Robert E. Lempke of Johns Hopkins Hospital and Harris B. Shumacker, Jr., of Indiana University.

The scientists made their findings by freezing the tails of mice. When the frozen tails were rapidly warmed, no gangrene set in, but it did when cold was applied.

Rapid thawing and a solution of tetra-

ethylammonium were found effective in preventing gangrene when used individually or together. Another satisfactory method was to use these with heparin which limits blood clotting.

Science News Letter, August 13, 1949

CHEMISTRY

New Chemical To Replace Benzedrine in Inhalers

➤ A NEW chemical compound will replace benzedrine in nasal inhalers used to relieve colds, hay fever, and sinusitis, Smith, Kline & French Laboratories, pharmaceutical manufacturers, announced.

The new remedy is called Benzedrex and its discovery is credited to Dr. Glenn E. Ullyot, head chemist for the firm. It has the advantage of being able to shrink the nasal membranes and thus relieve the congestion in the nose. At the same time it does not stimulate the user the way benzedrine does.

The search for this substitute chemical remedy grew from the reports of prisoners who removed the benzedrine-medicated paper from inside the containers to chew them or dunk them in beverages to get a "lift." Recently a bill was submitted to Congress which would have required a physician's prescription to obtain the benzedrine inhaler.

Other forms of benzedrine used by physicians to treat a variety of conditions will be obtainable by prescription, the firm stated.

Science News Letter, August 13, 1949



SUBSTITUTE FOR BENZEDRINE INHALERS—Benzedrex, the new relief for colds, is shown undergoing tests by Dr. Glenn E. Ullyot, its discoverer. Dr. Edwin J. Fellows, who directed the experiments on the new drug, is watching the procedure.

MEDICINE

Disease of Poultry Spreading to Humans

➤ NEWCASTLE disease, a serious poultry sickness, appears to be spreading to human beings, the American Veterinary Medical Association warned. In human cases, the eyes, nervous system and respiratory tract are affected.

The malady, which was first detected in 1926, is now known wherever chickens are raised. Its principal manifestations in poultry are a high death-rate among young chicks and sharp reduction in laying rate among mature fowl. Vaccines are the principal means of combating it.

Science News Letter, August 13, 1949

OPHTHALMOLOGY

New Lens Blurs Vision But Improves Eyesight

➤ A LENS that will rest the good eye while putting the laggard eye to the work of seeing was announced by the American Optical Company, Southbridge, Mass.

Working on the principle that some patients afflicted with cross-eyes use only one eye to see with while letting the other lose from disuse its ability to see, scientists devised a slightly pebbled clear glass. This lens will blur the vision in the working eye and so force the poorer eye to perform the task of seeing.

An advantage credited this lens is that it looks much like an ordinary spectacle lens with the eye visible. Previously, treatment in such cases called for eye patches or opaque lenses which attracted attention to the condition and made people reluctant to wear them.

Science News Letter, August 13, 1949

MEDICINE

Expectant Mothers Warned Of Fungus-Disease Danger

➤ MOTHERS-TO-BE are faced with a new danger to their lives, warn Drs. Leroy E. Smale and J. W. Birsner of Kern General Hospital, Bakersfield, Calif.

Four women who died and a fifth who is expected to die from a tuberculosis-like disease called coccidioidomycosis are reported by the physicians in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Aug. 6).

This disease is caused by a mold or fungus which usually enters the body through the breathing passages and may start as a "cold." It causes tumors to form on the lungs, skin, viscera, bones and sometimes the meninges. Abscesses may form on the skin, and the pus from these will usually reveal the presence of the disease upon examination.

Because the disease resembles tuberculosis which can be transmitted to the off-

spring by the mother, the physicians tested for this possibility but concluded that as far as can now be determined this fungus-borne condition is not congenital.

The doctors urge that all pregnant women in areas where the disease is prevalent, such as Los Angeles County, have skin tests if they have symptoms in the upper part of the respiratory tract. They recommend the same test for expectant mothers with meningitis.

Science News Letter, August 13, 1949

PHOTOGRAPHY

Faster Shutter and New Indoor Color Film Devised

➤ THE fastest shutter of its type in the world and a new type of indoor, color roll film were announced by the Eastman Kodak Company.

Eastman said the new between-the-lens shutter, which will be incorporated in a new model camera, has an accurate top speed of one eight-hundredth of a second, making it the fastest shutter of this type.

Blades in the shutter pivot and rotate through a partial circle inside the shutter housing, opening and closing the aperture in a single stroke, it was explained.

The new film is similar to other Kodacolor film, but it requires no special filters for taking pictures indoors or outdoors at night with flash or flood bulbs. If used in daylight, however, the new Kodacolor film, type A, should be used with a filter, it was explained.

Science News Letter, August 13, 1949

ASTRONOMY

New Star Spotted in France Was Studied Here

➤ A "new star" or nova, has been discovered in France and studied in Texas by two visiting French astronomers.

The new discovery and its tale of international cooperation among French astronomers was reported by Dr. Harlow Shapley, director of the Harvard College Observatory.

The star was spotted Aug. 1 at Meudon, France, near Paris, by Charles Bertaud. Word of the find went from France to the European clearinghouse for astronomical information at Copenhagen and then to the North American center at Harvard.

With the information sent from Harvard, Dr. Guido Munch at the McDonald Observatory of the Universities of Texas and Chicago at Fort Davis, Texas, confirmed the discovery. Spectrum studies of the star were then made of the star by two visitors to the Texas observatory, Victor Kourganoff and Mlle. Canavaggia, both from France.

The star was found in the constellation of Scutum, the shield.

Science News Letter, August 13, 1949



NUCLEAR PHYSICS

New Radiation-Measuring Device May Aid in Research

➤ A NEW device for measuring radioactivity may replace the Geiger counter in certain phases of atomic research.

The instrument, an alpha scintillation counter, has been developed by Dr. Benedict Cassen, Clifton Reed, Leonard Baurmash and Lawrence Curtis of the Atomic Energy Project on the Los Angeles campus of the University of California.

In low rate counting problems encountered in some health physics and dust study applications, Geiger counters have not been entirely satisfactory, according to atomic researchers. Long runs are necessary to obtain statistically adequate numbers of counts in view of the background caused by cosmic radiation. Frequently Geiger counters become insensitive or give erratic groups of counts in this type of research.

The new type of counter eliminates these obstacles, functioning more efficiently on low rate counting problems. Its greatest utility is in measuring very slight amounts of radioactivity in dust, soil samples, and ashes of biological specimens. The basis of operation is the measurement of alpha particle scintillations by photo-multiplier tubes.

The device is about the size of a table model radio and is entirely automatic once the radioactive sample to be measured is inserted and its mechanism started.

Science News Letter, August 13, 1949

MEDICINE

Dry Ice for Acne Found Effective

➤ ACNE pimples can be weeded out and destroyed with little or no scarring of the skin with the use of dry ice, Drs. Carroll S. Wright and E. R. Gross of Philadelphia reported in the ARCHIVES OF DERMATOLOGY AND SYPHILOLOGY (June) published by the American Medical Association.

Each pus sac in the skin is lightly touched with dry ice from three to five seconds, the physicians said. Or if there is a cluster of acne pustules close together, a large piece of ice is applied. Since the pimples are usually elevated the ice leaves the skin between them untouched.

The dry ice makes the pimple blister, then dry and shrink. Little or no scarring was noted by the physicians in over 2,000 acne patients treated by them with dry ice.

Science News Letter, August 13, 1949

E FIELDS

MEDICINE

Female Sex Hormones Rob Patient of Masculinity

➤ FEMALE sex hormones which were absorbed through the skin of a man working with them made him lose his masculinity, two physicians reported in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Aug 6)

The anti-masculine effect followed the patient's assignment as a chemist to a pharmaceutical firm where he extracted and purified these substances from the urine of pregnant women. It was found that his hands were often in contact with alcoholic solutions containing high concentrations of the hormones, according to Drs. Max A. and Joseph W. Goldzieher of St. Clare's Hospital, New York.

Improvement was noted in the patient after he quit his job and was treated with male sex hormones.

The physicians point to this case as an illustration of the harmful effects that may follow if large amounts of these hormones should by accident be absorbed through the skin. They feel it is important for other doctors to keep this possibility in mind.

Science News Letter, August 13, 1949

PSYCHOLOGY-NUTRITION

If Mother Is Short on B₁ Child May not Learn Fast

➤ IF A nursing mother's diet lacks thiamine (vitamin B₁) her baby may later be subnormal in ability to learn. If, on the other hand, she eats more thiamine than she needs, the baby may turn out brighter than normal.

This is indicated by tests with infant rats which were kept on a synthetic diet with controlled amounts of thiamine. The nursing "mother" received the experimental diet until the babies were weaned at the age of 21 days. Then the babies were continued on the diet until they were eight weeks old. They then were given a normal diet for a week before their learning ability was tested. This allowed the vitamin-deficient animals to gain weight and strength before the learning began.

One group of 18 animals was given a normal diet for the whole period of the experiment. Seven other groups of 18 animals each were given the synthetic diet containing varying amounts of thiamine from a diet markedly deficient to one greatly in excess. For one of these latter groups the diet was further enriched with the other B vitamins.

The experiment was conducted by Dr. Philip H. O'Neill, of Fordham University, who reports results in the JOURNAL OF GENETIC PSYCHOLOGY. A daily allowance of less than three millionths of a gram of thiamine diminished maze learning ability below normal; he found. More than one hundred millionths of a gram a day improved maze performance above normal.

But variations in the thiamine content of the diet between three millionths of a gram and one hundred millionths of a gram did not make much difference in the ability to learn.

When the baby rats received an excess of thiamine, adding large amounts of the other B vitamins to the diet did not improve learning.

Science News Letter, August 13, 1949

METEOROLOGY

Frozen Raindrops Have Unfrozen Centers

➤ FROZEN raindrops (no, don't look for them now, next Christmas, maybe!) are hollow spheres of ice, with hearts of liquid water that never freezes, no matter how cold they get.

A physical explanation for this meteorological paradox is offered by a Japanese scientist, Dr. Kotaro Honda. Freezing takes place from the outside inward, he points out. Ice expands as it forms, so that the unfrozen interior of the drop is placed under ever-increasing pressure.

Dr. Honda's calculations indicate that at minus 33 degrees Centigrade (27.4 degrees below zero Fahrenheit) this internal pressure is on the order of 50,000 pounds per square inch.

The same internal-pressure effect keeps part of the water liquid within ice-coated trees, Dr. Honda states. Harmful drying out in extreme freezing weather is thereby prevented.

Dr. Honda summarizes his calculations in a letter to the editor of the British science journal, NATURE (July 30).

Science News Letter, August 13, 1949

CHEMISTRY

Meatier Chickens Foreseen With Synthetic Feed

➤ CHICKENS need more of one amino acid (a building-block in meat-making) than comes naturally in their vegetable feeds, so they will henceforth receive it from a man-controlled source.

DL-methionine, the lacking but necessary amino acid, will be produced synthetically in quantity by the Dow Chemical Company, it is announced in CHEMICAL AND ENGINEERING NEWS (Aug 1). This is expected to mean meatier chickens produced in less time and at lower cost to the farmer.

Science News Letter, August 13, 1949

ZOOLOGY

Red Howler Monkey Found To Be Very Conservative

➤ A RED HOWLER is neither a party-liner nor a red-baiter. He's a tough old conservative monkey.

This non-political finding about the attitude, and abilities, of the South American monkey was reported to the Smithsonian Institution in Washington by Dr. Philip Hershkovitz, who made field studies of the red howler in the jungles of northern Colombia.

Dr. Hershkovitz's description of the monkey sounds like a left wing view of the political conservative. The scientist found the red howler "a comparatively sedentary animal, sluggish in movement, conservative in habits."

The conservative monkey, he explains, is a die-hard who sticks close to his home and old ways. The red howler will starve rather than adapt to new conditions.

This conservatism may be a good thing for human neighbors of the jungles where the monkey lives. The Smithsonian scientist said that the red howler continues to live—or starve—on its usual jungle foods, even when civilization pushes the jungle back. Less conservative near-monkey-relatives of the red howler will loot cultivated fields.

Science News Letter, August 13, 1949

ORNITHOLOGY

Terns Losing Ground to Gulls at Park Rookery

➤ A GREAT struggle for existence is going on among the birds at Molly Island, bird rookery in the south end of Yellowstone Lake.

On these two small barren islands, near the southern tip of Yellowstone Lake, some 5,000 white pelicans, cormorants, California gulls, and Caspian terns nest annually. Of this total number of birds observed only 30 terns were counted and they were battling for their life.

The adult Caspian terns were cooperating to save the lives of their young. The young terns were huddled together and the parent birds made a complete circle around them, facing outwards, to watch and drive off the California gulls who were charging frequently and fiercely. When the gulls would approach too closely to this circle, the terns would fly up and savagely attack the gulls. Battles in mid-air ensued.

The outnumbered terns were apparently fighting a losing battle.

Tourists are not permitted to visit Molly Island because of the nesting birds. Once a year the park's chief naturalist and some of his staff visit the islands to check on the birds. On this year's visit 307 birds were banded for the U. S. Fish and Wildlife Service.

Science News Letter, August 13, 1949

AGRICULTURE

Climatic Doubles Are Charted

By careful comparison of crop regions of the world suitable homes may be found for more productive emigrant crops to replace low-yield natives.

By DR. FRANK THONE

➤ HAVE you ever met your double? Doubtless you have had the slightly awkward experience of being warmly greeted by a stranger, who calls you by a name you have never heard and asks you about a family you don't have in a town you have never seen. After you have convinced the cordial stranger that you are you and not somebody else, but no offense taken, he may still insist, "But you sure do look like him, anyway!"

Being a double sometimes proves profitable, if your unknown counterpart happens to be a movie star in need of a stand-in. If he happens to be a political dictator afraid of being shot at the resemblance may be less of a matter for self-congratulation.

Places as well as persons have doubles, scientists tell us. Somewhere on this globe the locality you live in is so closely duplicated in essential climatic features that you could settle down there and hardly notice the difference—except that the neighbors might be Chinese or Zulus instead of familiar American faces. But you'd see corn or cotton or wheat in the fields, and somehow the sight would make you feel at home.

Immigrants' Adjustments

In a rule-of-thumb sort of way, this has long been recognized in immigrants' adjustments to new lands. Early German comers were fond of the Rhine-like banks of the Ohio ("Vass you effer in Tsintsin-nati?"), Scandinavians have tended to concentrate in Wisconsin, Minnesota and the Dakotas, Ukrainians found Canada's prairie provinces inviting, colonizing Spaniards and later-arriving Italians saw their homeland hills replicated in California.

More exact identification of geographic doubles is needed, however, in the exacting business of finding suitable homes for emigrant crops. The world is hungry now, and at the rate its population is increasing it will get even hungrier unless every acre is made to produce its maximum of food. To do this, it may be necessary in many places to replace low-yield natives with more productive strangers. It is no time for tradition or sentiment.

However, neither is it time for hit-or-miss experimentation. It was luck that an obscure tuber from the cool lands of Chile succeeded so well in northern Europe that it is now known as the "Irish" potato. Luck,

too, that tobacco from the New World found congenial conditions in Turkey and Egypt. We hear of such successes, but not of failures: how American corn was found unsuitable in Germany, or European grapes for the Atlantic seaboard of this country.

To insure the highest possible success score on first tries, and to reduce the number of costly false starts, the logical thing would seem to be a careful comparison of crop regions the world over, to find where else its climatic and other conditions are duplicated. Then we can do a better job of distributing such seed stocks as we have for rehabilitation purposes. Also, we can take a good look at what our neighbors' land does well with, and know where to send the seed we swap for—whether a new soybean variety should go to Illinois or Georgia, or whether something choice in celery should be tried out first in Michigan or Florida.

Identifying "Doubles"

Here is where the American Institute of Crop Ecology comes into the picture. It is a relatively new organization, small as yet, headed up by Dr. M. Y. Nuttonson, formerly a senior agronomist in the Office of Foreign Agricultural Relations in the U. S. Department of Agriculture. The Institute has undertaken the ambitious program of examining all available data on the world's climates, identifying "doubles" in terms of crop-raising possibilities and spotting them in on the map.

Dr. Nuttonson knows that the task will not be an easy one. There are still vast blank spaces on the climatological maps, where observers have been all too few. However, even in lands that might seem at first glance most unpromising there are sometimes surprising numbers of forward-looking officials and scholars, as well as helpful missionaries, traders and other foreigners. Colonial and former colonial areas are better sources of information, and of course countries with long histories and stable cultures are the richest mines of data.

In working out the climatic picture for any given locality such sweepingly general figures as average annual rainfall, mean temperatures for summer and winter, and direction and average velocity of prevailing winds will not do. Too many deadly extremes can be deceptively hidden in these flattened-out averages. There must be breakdown into smaller units—monthly highs and lows as well as averages.

Length of growing season is important,

it is determined as a rule by the number of days between the latest killing frost in spring and the first freeze in autumn. Number of hours of daily sunshine enters into the formula, longer days in such places as Alaska and Norway may offset to a considerable extent the lower temperatures. The number of seasons for which complete records have been kept is of importance, too: the longer the record the more dependable it is likely to be in getting at averages, and the more likely it is to show really critical extremes.

After Dr. Nuttonson has compiled all available figures for as many observation points as possible for a given region or country, he marks in on its map, in parentheses, the names of the American states with climates most nearly resembling those of its provinces or other divisions. These pairings he calls "climatic analogues."

Climatic Analogues

Perhaps the most interesting job of this kind he has done so far is the climatic-analogue map of China. Territorially, Greater China is considerably larger than the United States, its extent is about the same from east to west, but greater from north to south. Hence some of its climatic analogues must be expressed in terms of Canada rather than of the United States.

Thus, on his map the notation (Manitoba) appears across the northernmost part of Manchuria, with (Saskatchewan) somewhat to the southeast of it. Southern Man-



WEST GOES EAST—Tobacco, a plant of American origin, growing on a plain a dozen miles east of Rome, is being picked by an elderly Italian woman.



NORTH GOES SOUTH—Wheat, a crop that originated in the Northern Hemisphere (probably somewhere in the Near East), is being harvested by a husky Maori native in New Zealand.

chuiia bears the notations (South Dakota) and (Nebraska) Korea is likened to Minnesota and the great Chinese peninsular province of Shantung is equated partly with Kansas, partly with Wisconsin.

At the other extreme, such southern Chinese provinces as Kunnan, Kwangsi and Kwangtung, which are usually frost-free the year round, all bear the notation (Florida). The name of Texas appears in a number of places on the map.

It is even possible, in many instances, to find climatic "doubles" in this country for individual cities in China. Thus, the American city with a climate most nearly like that of Peiping is Salina, Kans., Dr. Nuttinson adds the remark that Salina is "slightly warmer." The climatic analogue of Canton is Cedar Keys, on the Gulf coast of Florida, that of Nanking is Paw-

huska, Okla. Harbin, in Manchuria, has a climate most like that of Winnipeg, remote Urga, in Mongolia, has its "double" in the northwestern Canadian city of Prince Albert.

These climatic analogies between China and North America do not surprise scientists. Agronomists recall how quickly China adopted such New World crops as corn, potatoes, peanuts and tobacco, and how we in turn have received such good gifts from China as soybeans, rice, citrus fruits and tung trees. Botanists have long pointed out the curious fact that prominent in the Chinese flora are trees like the chestnut and shrubs like rhododendron, which we are apt to think of as peculiarly American. The value of Dr. Nuttinson's studies lies in the closer pin-pointing of these hitherto generalized facts, with consequent possibilities of earlier and more profitable applications to practical problems.

Science News Letter, August 13, 1949

INVENTION

Calves Feed Themselves From Nipple-Equipped Pail

➤ "BABY-SITTER" for bossy-cow is a newly designed milk pail with a plastic nipple near the bottom, for use by the calf separated from its mother. It is a product of General Electric, far removed from the giant electric generators and 50,000,000-volt atom-smashing betatrons which the same company builds.

Hung on a fence, it enables new-born calves to take their milk under conditions similar to natural feeding, so that they can be separated from their mothers two days after birth. A check-valve, made of molded plastic, compels calves to drink in small sips and keeps them from gulping large quantities of air.

This new calf-feeding device has a name of its own. It is a "calf-teria" and it is to be marketed by the Calf-teria Company of Fort Wayne, Ind.

Science News Letter, August 13, 1949

ENGINEERING

Fertilizer Material Mined Faster with New Equipment

➤ EIGHT tons of potash ore for fertilizer is now dumped each minute from a new mine hoist in Carlsbad, N. Mex., which carries the ore automatically to the surface from 1,150 feet below ground.

Two ore buckets, or "skips", each with an eight-ton capacity, operate in the vertical shaft, alternately being loaded and hoisting the ore to the surface. The new "push-button" drive and control equipment, driven by a pair of 500-horsepower motors, was developed by the General Electric Company.

Science News Letter, August 13, 1949

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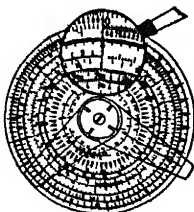
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ENGINEERING

French Coal-to-Gas Trial

➤ FRENCH experimental work in converting coal to gas, without removal of the mineral from the underground seams in which it occurs in nature, is to be reviewed at the meeting this month of the United Nations Scientific Conference on the Conservation and Utilization of Resources at Lake Success, N Y, by Prof Doumenc of the St Etienne, France, School of Mining.

This international organization is known as UNSCCUR for short, and during its coming meeting, which begins Aug 17, some 500 scientific papers will be presented by outstanding scientists and engineers from 70 countries in all parts of the world.

The gasification of underground coal has been undertaken in past years in several parts of the world, notably in Russia and the United States. Satisfactory and economical commercial processes have not yet been developed although experimental work gives every promise for the early future. Gases obtained can be used for firing boilers or converted into synthetic liquid fuels such as gasoline and heating oil.

The French work is being carried out in the Djerada anthracite field in Morocco.

This anthracite contains only five percent of volatile matter and the problem is largely to convert the coal into carbon monoxide. Exceptionally favorable conditions exist for the experiment in the site selected because of the outcropping panel, the almost vertical dip of the seam, and the absence of flooding. On the other hand the composition of the coal and the thinness of the seams mean that the scheme will have to be planned with great care.

At the same meeting an American experiment in gasifying coal in place under ground will be discussed by M H Fies, of the Alabama Power Company, and James L Elder of the U S Bureau of Mines. The undertaking is a joint project, near Gorgas, Ala., of these two organizations and is now in its second year.

The first year's work was successful. A better quality gas is expected this year from the experience gained. Other objectives of the second experiment are to determine the quantity of coal that can be gasified from a given initial combustion zone and the shape and the extent of the burned-out areas formed during the gasification. Also it is designed to test various

types of installations and to determine their operational characteristics under variations of conditions.

Science News Letter, August 13, 1949

Words in Science— ASTEROID-COMET

➤ AN asteroid is one of many thousands of tiny planets which move around the sun, principally in the region between the orbits of the planets Mars and Jupiter. Although they look like stars, they differ from them in that they shine only by reflected light. They are believed to have been born of the disruption of a small planet that wandered too close to a larger one.

Although some asteroids move in orbits like those of the short-period comets, comets are very different in nature. Comets are not solid bodies, but great clouds of gas, surrounding small clusters of particles. Astronomers do not know how, when or where comets were formed. A bright comet appears as a fuzzy spot in the sky with a tail stretching out like a plume of smoke, always away from the sun.

Science News Letter, August 13, 1949

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by Carl Coke Rister

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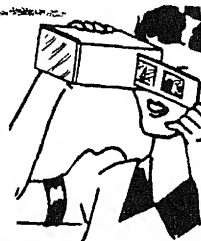
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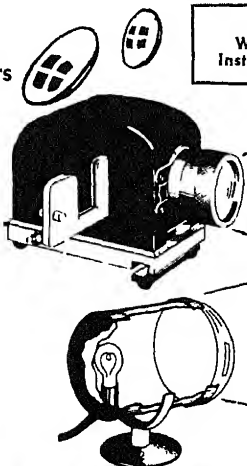
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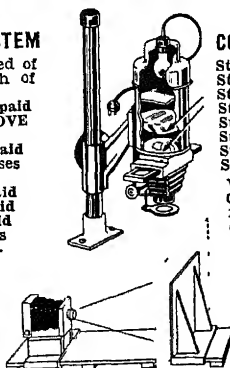
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FORESTRY

NATURE RAMBLINGS

by Frank Thone



Don't Raise Hell!

➤ **HELL**, to rangers in the U S Forest Service and the National Park Service is not a remote theological concept, it is a near and terrible physical reality. They don't merely believe in it, they know it. Many of them have been there, any of them may be called upon in regular line of duty to go there at any time, especially

in late summer. For a forest fire, with its horrors of agonizing death to all forms of wildlife and its aftermath of charred ruin, surpasses even the gimmest of Dante's nightmares.

Every summer vacationer, camping, hiking or fishing in the national forests and national parks, carries in his pocket a bunch of keys to this hell. Unless he is a criminal or a lunatic he will not use them deliberately, he is much more likely to loose the furies of flame through sheer inadvertence, through plain forgetfulness of where he is and with what perils he is surrounded.

Most of the millions of people who annually make recreational use of our national forests and parks are city folk. Typically, when an urbanite lights a cigarette or a pipe outdoors, he simply tosses the match away, never bothering to see whether it is out or not and taking no note of where it falls. Similarly, when his cigarette is finished he tosses the butt aside, still smoldering. That may not be so bad in town concrete sidewalks and asphalt pavements are not combustible. But that kind of thoughtlessness may mean the start of a million acres of devastation and thousands of animal lives lost—not to mention the possibility of human tragedies as well.

Danger of man-caused fires becomes especially great during August and early September, which are dry weeks in most of our forested areas, and at the same time are the period of heaviest tourist traffic. It therefore behooves everyone making use of such recreation areas to give careful thought to his stewardship, never relaxing his personal fire-watch for a moment.

Rules are simple enough. Don't throw away a match until you can pinch the blackened end between your fingers and feel no heat at all. Don't merely pinch out your cigarette butt or grind it under foot, slit it up one side and rub the crumbs between your hands, again until everything is quite cold. And never leave a campfire until you have drowned the last ember in gallons of water.

Science News Letter, August 13, 1949

ENGINEERING

Patented House Has Drains for Hot, Dead Air

➤ **IS YOUR** house hot, these days?

Maybe dead air, trapped in attics and under-eaves spaces, is to blame. It is on this theory that Robert Stevenson of Lynbrook, N. Y., has developed a house design that provides drainage ducts and vents within the wall spaces, to circulate air into these neglected glory-holes and equalize the temperature throughout the structure. U. S. patent 2,477,152 has been issued to him on this idea.

Science News Letter, August 13, 1949

RADIO

Saturday, August 20, 3:15 p. m., EDST

"Adventures in Science" with Watson Davis, director of Science Service, over Columbia Broadcasting System.

Dr. Chester S. Keefer, of Boston, chairman of the committee of the National Academy of Sciences on the Investigation of Cortisone, will discuss "Progress in Arthritis Therapy."

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ENERGIE ELECTRIQUE EN FRANCE—L. Babonnet—260 p., illus., \$6.00. A graphic presentation of the power resources of France. The artistic photographs which illustrate this work make it of interest to the photographer and the lover of the French countryside as well as to the engineer. Statistics are also included on hydroelectric equipment—plants, reservoirs, power, production.

GENESE DES PLANETES—Alexandre Duvalier—350 p., illus., \$5.00. Presenting the theory of the author, a professor in the College de France, with regard to the origin of the planets. His is a two-part theory that the planets exploded out of the sun in a great celestial catastrophe, the other part, a chemical aspect, assumes the photosynthesis of glucides and then of protides at the expense of water from carbon dioxide and ammonia gas, the material thus formed being progressively organized into the form of our universe.

TOPOGRAPHIE—Le General de Fontanges—224 p., \$1.50. This little book will be of interest to all those who make or use maps. The chapter on photography shows how profoundly ancient methods of map making have changed with the advent of modern photographic techniques.

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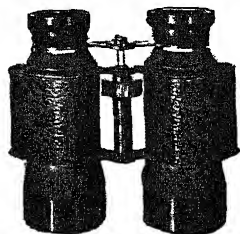
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ATOMS IN ACTION—George Russell Harrison—*Morrow*, 3rd ed., 406 p., \$5.00. A non-technical book on the applications of modern physics.

CHEMISTRY OF SPECIFIC, SELECTIVE AND SENSITIVE REACTIONS—Fritz Feigl—*Academic*, 740 p., illus., \$13.50. A book for chemists which attempts to discover the regularities and rules that govern specificity, selectivity, and sensitivity by examining the details of analytical procedures of Brazilian origin. Translated by Ralph E. Oesper.

COME TO THE FARM—Ruth M. Tensen—*Reilly & Lee*, 35 p., illus., \$2.00. Written at the primer level, this book follows *Come to the Zoo* which was at pre-primer level. For every boy and girl to learn about the farm animals, with its brief text illustrated by many beautiful photographs.

CONTRIBUTIONS TO EMBRYOLOGY, Vol. XXXIII, Nos. 213 to 221—*Carnegie Institution of Washington*, 186 p., illus., paper, \$8.50 (\$9.25 in cloth). Studies of Rhesus monkey and human embryos.

COURTSHIP AND MARRIAGE A Study in Social Relationships—Francis E. Merrill—*Sloane*, 360 p., \$3.75. An educational aid to the study of courtship intended as a source of insight into the adventure for those about to embark on it.

DICTIONARY OF OCCUPATIONAL TITLES, Vol. I. Definitions of Titles—Division of Occupational Analysis—*Gov't Printing Office*, 2nd ed., 1518 p., \$3.50. Contains 22,028 definitions of jobs in the American economy, arranged alphabetically according to job title.

DICTIONARY OF OCCUPATIONAL TITLES, Vol. II. Occupational Classification—Division of Occupational Analysis—*Gov't Printing Office*, 2nd ed., 743 p., \$2.00. Shows the relationship between jobs in the various industries and classifies them by code number. Includes a glossary of technical terms used in describing jobs.

A FACSIMILE OF A REPORT ON THE ROCK OIL, OR PETROLEUM, FROM VENANGO COUNTY, PENNSYLVANIA—Benjamin Silliman, Jr., in 1855—*Paul H. Giddens*, 20 p., illus., paper, \$1.25. A reprint of a chemical classic that touched off the petroleum industry. Reprinted for the 90th anniversary of the founding of the industry.

FUNDAMENTALS OF BACTERIOLOGY—Martin Frobisher, Jr.—*Saunders*, 4th ed., 936 p., illus., \$5.50. A beginning text revised to include the latest material. For students who have some knowledge of chemistry, physics, and biology.

HUMAN ASPECTS OF ENGINEERING—Theodore F. Hatch—*Industrial Hygiene Foundation*, 3 p., paper, free upon request to Industrial Hygiene Foundation, 4400 Fifth Avenue, Pittsburgh 13, Pa. An article on the social effectiveness and responsibilities of the engineer.

LAYOUT The Practical Application of the Prin-

ciples of Design to Advertising and Printing—*Charles J. Felten*, 2d ed., 156 p., illus., \$6.00. Techniques for planning, designing and production of all types of printed matter for both the small printer and the art director.

NEW WORLD OF CHEMISTRY—Bernard Jaffe—*Silver Burdett*, 710 p., illus., \$3.40. A high school text.

NUCLEAR FISSION AND ATOMIC ENERGY—W. E. Stephens, Ed.—*Science Press*, 294 p., illus., \$5.00. The result of a series of seminars on nuclear fission held in the Physics Department of the University of Pennsylvania in the fall of 1945, this book is a review of the known facts published in the literature.

ORGANIC CHEMISTRY A Brief Course—R. Q. Brewster—*Prentice-Hall*, 409 p., illus., \$6.00. A college text for a one-semester course.

PROCEEDINGS OF THE FIRST ANNUAL NORTHERN CALIFORNIA RESEARCH CONFERENCE—*Stanford Research Institute*, 68 p., illus., \$2.00. Sponsored jointly by The San Francisco Chamber of Commerce, University of California, Stanford University and the Stanford Research Institute, this conference was for better understanding between business and research. Complete texts of speeches, round tables, and discussions.

PROGRESS IN NEUROLOGY AND PSYCHIATRY An Annual Review, Vol. IV—E. A. Spiegel, Ed. *Gruene & Stratton*, 592 p., \$10.00. Leaders in the field write on the foremost advances during the past year.

SINCE TEACHING In Rural and Small Town Schools—Glenn O. Blough and Paul E. Blackwood—*Gov't Printing Office*, 55 p., illus., paper, 20 cents. All school children are full of questions about science. This Office of Education booklet offers practical suggestions to teachers. Contains a list of instruction materials.

STUDIES IN THE ANTHROPOLOGY OF BOUGAINVILLE, SOLOMON ISLANDS, Vol. XXIX—Douglas L. Oliver—*Peabody Museum*, 97 p., illus., paper, \$5.85. Four papers completed in manuscript in 1941 telling of the findings of the Peabody expedition to Bougainville, in 1938-39.

ULTRASONICS—Benson Carlin—*McGraw-Hill*, 270 p., illus., \$5.00. Slanted toward the practical rather than the purely theoretical, this book correlates much of the scattered data.

THE WHOLE LIFE CYCLE OF CHROMOSOMES AND THEIR COILING SYSTEMS, Vol. 39, Part I—L. R. Cleveland—*American Philosophical Society*, 100 p., illus., paper, \$1.50. A monograph for the advanced student.

WHY INDUSTRY MOVES SOUTH—Glenn E. McLaughlin and Stefan Robock—*National Planning Association*, 148 p., \$3.00.

WRITING FOR LOVE OR MONEY—Norman Cousins—*Longmans, Green*, 278 p., \$3.50. Thirty-five essays reprinted from the *Saturday Review of Literature*. Well-known writers tell about writing for those who are preparing for a writing career.

Science News Letter, August 13, 1949

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❁ **TWO-SPEED** lawnmower resembles somewhat familiar mowers pushed by hand but has a gear arrangement by means of which the rotating cutting blades may be driven at a low or at a high speed. In this recently patented device, the cutting blades do not rotate about the main axle as in most mowers, but are positioned behind.

Science News Letter, August 13, 1949

❁ **KITCHEN AID** for housewives, a British invention, can be used for polishing shoes, scouring pans, peeling potatoes, grinding meat and coffee, beating eggs and other jobs, it is claimed. It is an electric device, on a table-high stand, equipped with various detachable tools for the various jobs.

Science News Letter, August 13, 1949

❁ **EGGS** are pasteurized and sterilized without breaking the shell, and without cooking, by means of a high-frequency electrostatic field in a recently patented device. Condenser plates, adjustable and made to place over the ends of egg, assure uniform heating throughout the contents of the shell, and there is no appreciable coagulation.

Science News Letter, August 13, 1949



❁ **FISHING TOY** for youngsters, shown in the picture, includes two fish poles with small magnets on the ends of the lines and six tropically colored plastic fishes with metallic noses so that they are attracted to the magnet on the line. It is designed for either outdoor or bathtub use.

Science News Letter, August 13, 1949

❁ **MODEL "B" POWER** supply unit, radically new in design, includes new heavy-type selenium rectifiers with wide range variable voltage control, damped volt and ammeter, eight power tap adjustments and heavy-duty switch. It is designed for testing or operating automobile radio receivers, but has many other applications.

Science News Letter, August 13, 1949

❁ **PEPPER GRINDER**, an improved type for use on the dining table together with a companion barrel-shaped, metal-topped and bottomed glass salt shaker, provides a superior taste to the food on which used because of the retained aroma and the flavorful oils of the pepper berry. A few berries are placed in the tiny mill at each filling.

Science News Letter, August 13, 1949

❁ **SOLDERING IRON** is heated chemically without use of an electric current, blow torch or furnace. A cartridge inserted in it contains a chemical mixture of certain magnesium-type powder, capable of generating intense heat. Ignition is caused by the impact of a spring rod, pulled out and released at the back of the handle.

Science News Letter, August 13, 1949

• Do You Know? •

Women in Norway are still awaiting nylon stockings, a Norway paper states.

The reason that white ash is the favorite wood for baseball bats is its high degree of shock resistance.

A few tree species may be planted direct from the seedling bed to the field, but most trees have a better chance of survival if they are transplanted to a nursery row for a year or two.

A wild weed of Central America, a variety of *Desmodium* commonly known as beggarweed, is now found to have a protein content of about 19%, and is equal to or better than alfalfa when chopped and added to poultry rations.

Under the skins of apples, pears, peaches or plums sprayed with DDT and parathion, none of the insecticide was found in laboratory tests; neither was it found in cider from apples having a small surface deposit of the insecticide.

Interior wood, in most climates and under normal conditions, never decays because the fungi that consume wood require more moisture than is apt to be found in the interior of buildings.

A rocket can travel where air is thin or non-existent because it carries an oxidizer to enable the fuel to burn, all other types of engines depend on surrounding air for oxygen.

Chile, the Pacific coastal country of South America whose length is 25 times its width, has a climate varying from semitropical in the north, through temperate zone conditions in its center to Antarctic cold in the south.

The Great Plains area now has some 25,000 miles of shelterbelts and farmstead windbreaks, planted mostly in the past 15 years; these rows of five to ten trees, with the taller ones near the center, conserve moisture and save crops from scorching winds.

Tissue treated with silicone is an effective cleaner of eyeglasses.

The first official meteorological records in America were started in 1814 when the Army Surgeon General ordered Army hospitals to record the weather.

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ASTRONOMY

Pressure Harms Science

Soviets' interference with science involves loss to them and to us because through international cooperation we could make a combined attack on problems.

➤ **ATTACKING** "the present pressure of politics on science in Russia," a leading American scientist said that the Russians, and to some extent the West, are "the losers"

Dr Harlow Shapley, director of the Harvard College Observatory in Cambridge, Mass., and a former president of the American Association for the Advancement of Science, said that the recently reported interference of the Soviet state with astronomy is nothing new. Dr Shapley, who is a leading proponent of cooperation with scientists in all parts of the world including the Soviet Union, commented to Science Service on the reports from Russia before his departure for Paris, where he has been invited to participate in a conference on United Nations research laboratories.

Before 1935, a Russian astronomer was "strongly censured by the government for an article he wrote emphasizing that celestial mechanics and related subjects could not be taught according to the tenets of dialectic materialism."

The astronomer, who had previously been on the staff of the Harvard Observatory, was Dr Boris Gerasimovic. He was later exonerated when someone in the Communist party came to the same conclusions about the teaching of astronomy.

By 1935, when Dr Shapley recalls talking to him in Paris, the Soviets had elevated Dr. Gerasimovic to the top position in Russian astronomy, director of the Pulkovo Observatory.

"He foretold at that time that there was to be conflict between science and political theory, and that there might be scientific victims, but he believed it was all in a great social cause, and he seemed willing to acquiesce, in hopes of the great future."

"Two years later," adds Dr Shapley, "he was liquidated along with six or eight other leading Russian astronomers for reasons that are still obscure."

"This purge of 1937-38 has naturally antagonized western astronomers against the Russian system," the American astronomer points out.

"Since the war, we have desperately attempted to maintain cordial relations because the science is naturally international and supranational, and cordiality is a good policy anyway."

Recent attacks by the Soviet on western astronomy are "as yet relatively trivial compared with the operations in the field of genetics," he suggests. This may be because "the science of astronomy touches social relations even less than music or physics."

Some of the reports of the Russian at-

tack on astronomy may be exaggerated he feels, but they are not the whole trouble.

"Science cannot flourish under the domination of a social system," he declares. "It must be free and not warped to fit an irrelevant plan."

"To the extent that they are prostituting their sciences in this direction, the Russians will be the losers, but we shall lose some also, because they are excellent scientists and they, with us, could help so much in the great scientific attacks on the ignorance, diseases, and the poverty of man."

Dr. Shapley compares the Soviet political pressure on science with the religious pressure on science in this country at the time of famous Scopes trial—the famed Dayton, Tenn., evolution or "monkey" trial in the summer of 1925—and more especially Hitler's distortion of anthropology.

"Whether it is the anti-evolution statutes in some of the American states, or Nazi attacks on the 'Jewish' relativity theory, or the Kremlin's telling the astronomers what cosmogony is good for them and what is bad, the outcome is bad, the spirit demoralization is dangerous."

He believes that nine-tenths of the Russian scientists "are aware of the social mistake, as were many of those who lived under Hitler, and many of the biological teachers in Tennessee, Mississippi and Arkansas."

"The Soviet version of the moment is the worst, because the affliction is nationwide. I wish I had some assurance the malady were transitory."

"There are symptoms in our own Congress," he charged.

"If the political control of free thought, of science, of music, arts and general culture should spread, we have dark ages ahead of us."

"Therefore, we cannot condone the Soviet infringement. Perhaps in some way we can help them discover the error and ultimate futility of their policy," concludes Dr Shapley.

Science News Letter, August 20, 1949

ASTRONOMY

Soviet Political Attitude Seen as Blow to Science

➤ "POLITICAL dictation in scientific theory" may be a blow to one of Russia's major sources of strength, her science, Dr Lyman Spitzer, Jr., Princeton University astronomer, has suggested.

Commenting on reports of attacks on

western astronomers and astronomical theories by the Soviets, Dr Spitzer declared that if the attacks are continued and expanded, "the future of astronomical research in the Soviet Union will be dim indeed."

"At present," he said, "Soviet astronomy enjoys a very high reputation in other countries."

But pure science cannot exist if ideological and political considerations are permitted to determine theories about nature, he warned.

"A deliberate policy of political dictation in scientific theory could bring only dubious, and short-term advantages to the Soviet Union, and would, in the long run, seriously impair the scientific eminence that is now a major source of strength to the U S S R," Dr Spitzer concluded.

Science News Letter, August 20, 1949

CHEMISTRY

"Soapless Soaps" Used in New Cream-Testing Method

➤ **TWO** of the new "soapless soaps", or synthetic detergents, are used in a new method of testing milk for its butterfat content that is quicker and simpler than the long-standard Babcock test. This new method is described in detail in the journal, *SCIENCE* (July 29) by its originator, Dr Philip Schain of the laboratory staff of the Staten Island Veterans Hospital.

Chemists know the two detergents as polyoxyethylene sorbitan monolaurate and dioctyl sodium phosphate. Solutions of the two are added successively, together with a dye that stains fats red, to make the readings easier. The effect of the detergents is to break up the thin protein films that surround the butterfat droplets in the milk. The fat then coalesces into a continuous mass, easily measurable in the special vessels used.

Science News Letter, August 20, 1949

ENGINEERING

New TV Glass Gives Better Day and Night Pictures

➤ **BETTER** television pictures are promised by the Pittsburgh Plate Glass Company with a new, especially developed screen face for use on metal picture tubes. The new glass is said to give sharp black and white contrast pictures both in daylight and in artificially lighted rooms.

The glass was developed primarily to meet the needs of the television industry, and is already in use by one major company. Its trade name is Teleglas. It produces a sharp picture directly on the tube face itself. It is claimed that it eliminates the need for costly filtering devices which were formerly placed in front of the tube in attempts to enhance contrast. It also eliminates dazzling brightness as well as faded grays from the picture face itself.

Science News Letter, August 20, 1949

MEDICINE

Hormones Against Cancer

Relief to breast cancer patients in the inoperable stage of the disease is being given by sex hormones, promising new weapon against the condition.

➤ BREAST cancer patients who are beyond the aid of surgery now are obtaining relief from a new medical weapon, sex hormones

Evidence of the relief-giving ability of the hormones was obtained in a study made of 105 women patients by Drs F E Adair, R C Mellors, J H Farrow, H Q Woodard, G C Escher, and J A Urban of New York. They report their study in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Aug 13)

Synthetic male sex hormone was given to 70 of these patients by injections into the muscles three times a week for one month or longer. Of 58 patients suffering with pain, 44 obtained temporary relief. Improvement was also noted in appetite, there was a feeling of well-being and relief of labored breathing.

Patients who had previously been unable either to work or to care for themselves could hold jobs and carry on a certain amount of normal physical activity after treatment. This improvement came after treatments of from two to 11 months and lasted for four months or longer in half of the patients.

Thirty-five patients over 40 years of age received the synthetic female sex hormone. Pain was relieved in 11 of 18 patients in this group. There was also the same improvement in appetite, breathing and sense of well-being as in the patients treated with male hormones.

The improvement appeared over periods of from two to 17 months and lasted seven months or longer in about half of the patients.

There was no evidence that the cancer was made more active by the male hormone, but, in one patient treated with female hormones, there was a greater rate of growth in the skin cancer which had spread from its original site in the breast.

Extreme reactions to the male hormone were noted in some patients. These included swelling of the legs, deepened voice, increase in the growth of hair, and acne. Only side reactions to the female hormone were nausea and vaginal bleeding.

Since this study began, 55 patients have died, the research team reported.

The Breast Clinic of the Memorial Hospital and the Sloan-Kettering Institute for Cancer Research were the site of the experiments. The work was aided by grants from the National Cancer Institute of the U S. Public Health Service, the American Cancer Society, the Albert and Mary Lasker Foundation, the Adele R Levy Fund and the Stranahan Foundation.

Sex hormones are designated as a third weapon now available to fight breast cancer by a committee of experts in a progress report to the Council on Pharmacy and Chemistry of the American Medical Association which is also published in the association's JOURNAL.

MEDICINE

New Anti-TB Drug

➤ FIRST animal trials with a new antibiotic having tuberculosis-fighting qualities revealed that it can arrest the activity of TB germs.

The antibiotic is lupulon, derived from hops, a necessary ingredient in brewing beer. Its anti-TB action in mice is reported by Drs Yin-Ch'ang Chin and Hamilton H. Anderson of the University of California Medical School in San Francisco, and Drs Gordon Alderton and J C Lewis of the Western Regional Research Laboratory in Albany, Calif., in the PROCEEDINGS OF THE SOCIETY FOR EXPERIMENTAL

A direct attack on breast cancer and the widespread lesions resulting from it can now be made with the hormones where previously no weapon for treatment had existed, the committee stated.

But they emphasize that surgery and X-rays are still the best treatments, and hormones should be used only as a last resort, when the other methods have failed or cannot be applied.

This research is still in its early stage, the reports point out. More knowledge must first be accumulated of the hormones' action and its end results. This is expected to come from the experience of researchers working with the new weapon all over the country.

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BIOLOGY AND MEDICINE (Jan)

One hundred mice infected with TB were used in the tests. Some got the lupulon by mouth, others had it injected into the muscles, while 40 were untreated and observed for comparison.

The result in the lupulon-treated mice was a four to one reduction in the severity of the disease in body tissues and organs. However, kidney damage was noted in the mice receiving the drug by the muscle route. Whether the antibiotic can reverse the symptoms of the disease has not been determined yet.

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ENEMY AIRCRAFT INTERCEPTOR—This Convair Lark, officially designated XSAM-N-4, is a shipboard-launched guided missile designed to intercept and destroy enemy aircraft before ship or shore target can be attacked. The missile is powered by a high thrust, liquid fuel rocket motor and was built for the Navy's Bureau of Aeronautics by Consolidated Vultee Aircraft Corporation.

GENERAL SCIENCE

Foundation Bill Stymied

➤ SCIENTISTS who are hoping that Congress—after four years—will finally pass a bill to set up a national science foundation have a new kind of problem. It's how to get a bill out of the Rules Committee of the House of Representatives.

The scientists include many of the nation's best-known men of science. They are experts at charting the paths of the tiny particles that make up an atom or probing the bits of stuff inside the cells of the human body or studying the faint specks of light that left distant stars billions of years ago. Leaders in nearly all major fields of science have told congressional committees for four years that they want to see the foundation created. Newest legislation to bring this about has been in the House Rules committee's lap for nearly two months without any action having been taken.

The Senate passed a science foundation bill in March, but the House Committee on Interstate and Foreign Commerce rearranged the measure and did not report it out until June 13. Since then, it has been in the Rules Committee. With many congressmen talking about adjournment, supporters fear that the foundation may die in the House for the third time in four years.

A new move to get action on the bill has just been taken. Rep. Robert Crosser, D., Ohio, chairman of the Commerce Committee, has introduced a resolution to bring the foundation bill to the floor of the House.

But here, again, scientists supporting the measure may be disappointed.

Under the parliamentary rules of the House, which it seems can approach some scientific rules in complexity, the resolution is referred to the Rules committee. If the committee does not act on either the science foundation bill or the resolution, Rep.

Crosser can call for a vote on his resolution, but not before Sept. 12 at the earliest. This type of resolution can be called up only on the second or fourth Monday of a month, and only after three weeks have elapsed following its introduction.

Thus, the science foundation's fate at this session of Congress appears to hinge to some extent on how long the law-makers are in session.

The foundation would be a new government agency, charged with administering government support of science. Four times in as many years, the Senate has approved it, but President Truman vetoed one bill and two others failed in the House. The present bill in the House, as well as the Senate version, will probably be approved, when and if it reaches the White House.

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On This Week's Cover

➤ SERENE, cool, immaculate, the water-lily floats beneath the summer sun. The delight of poets of all ages and peoples, this lovely flower has infected botanists, too, with poesy. Its learned Latin name, *Nymphaea*, needs no explanation. The real home of the waterlilies is in the tropics, here they develop all sizes and colors, including delicate pinks, glowing reds and gorgeous blues. There are only a few kinds of waterlilies in the United States, but two of them at least are real beauties. The Western species, that grows in ponds far up the slopes of the Rocky Mountains, is a splendid yellow. The Eastern species, that floats on all waters from the Great Plains to the Atlantic seaboard, is shining white, and fragrant as well.

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Question Box

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From what can foot-and-mouth disease vaccine be made? p. 118

RADIO

Saturday, August 27, 3:15 p.m., EDT

"Adventures in Science" with Watson Davis, director of Science Service, over Columbia Broadcasting System.

Dr. Walter O. Walker, director of research at Ansul Chemical Company, Marinette, Wis., will discuss "Modern Fire Fighting."

Fluorine, the colorless and dangerous gas usually obtained from fluor spar, was never much used except for etching glass until the fabulous research project that resulted in the atomic bomb got underway.

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ENTOMOLOGY

Track "Hot" Mosquitoes

Radioactivity is absorbed more by female mosquitoes than by male, study shows. "Tagged" insects also revealed that the female survives longer.

➤ FEMALE mosquitoes become more radioactive than their male companions reared in the same solutions of radio-isotopes. And nearly two-fifths of the radioactivity of these females is to be found in their legs, with practically none in their wings. Furthermore, the female of the species is much tougher than the male, in terms of survival: male insects tracked by means of their radioactivity lived only a few days, whereas the longest-lived females survived four weeks.

These are among newly-discovered facts of life among African yellow-fever mosquitoes, turned up by Drs. John C. Bugher and Marjorie Taylor at the Yellow Fever Research Institute at Lagos, Nigeria. They present a preliminary report on their research in the journal, *SCIENCE* (Aug. 5).

Drs. Bugher and Taylor "tagged" large numbers of the yellow-fever mosquito, *Aedes aegypti*, by rearing them during the last stage of their larval development in photographic trays of water containing small amounts of the radioactive isotopes of phosphorus and strontium.

This work was done independently of a similar project carried out at the U. S. Army Chemical Center in Maryland, and reported recently by Drs. C. C. Hassett and D. W. Jenkins.

More than a quarter-million of these "hot" mosquitoes were released in field

tests at the Lagos laboratory. They were detected subsequently with Geiger counters when they alighted on volunteer human "bait" at various distances up to 3,800 feet—more than half a mile.

GENETICS

Lysenkoism Menaces U. S.

Spread of the anti-Mendelian genetics of Russia is believed by the editor of the *Journal of Heredity* to be a threat to us because of its appeal to some groups.

➤ THE anti-Mendelian genetics of Lysenko, now the official biological gospel in the USSR, have more of an appeal even in this country than many scientists appear to realize, warns Robert C. Cook, editor of the *JOURNAL OF HEREDITY* (July). Calling attention to the declared intention of the new masters of Soviet science to make their views prevail by any necessary means, he declares:

"Our ground-rules of tolerant give and take are not understood by those who explicitly deny any tolerance, who cynically accept naked and irresponsible force as the ultimate arbiter. To extend the usual human-canine amenities to a dog suffering

from hydrophobia is obviously to invite disaster. To pretend that this fulminating madness can be placated is stupid. If the new doctrine according to Marx prospers, we will find it very difficult to arrange a divided peace with it."

The people most likely to accept Lysenko's revival of the Lamarckian doctrine of environment-induced changes in heredity are the moderately well-read group who nevertheless know little or nothing about science, Mr. Cook holds. They harbor suspicions that genetics "is tainted with racism and somehow represents most of the worst features of Presbyterian predestination." They are therefore prone to welcome any doctrine that promises to rid them of this dreaded though imaginary bogey.

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from hydrophobia is obviously to invite disaster. To pretend that this fulminating madness can be placated is stupid. If the new doctrine according to Marx prospers, we will find it very difficult to arrange a divided peace with it."

Summing up in his long article the whole history of the dispute that raged in Soviet scientific circles for years until it was decided in Lysenko's favor by political decree in 1948, the editor indicts the Russian leader as essentially ignorant of the very science over which he now wields power. He states that Lysenko has consistently avoided contacts with such Western scientists as have been in Russia, and that one English geneticist who did manage to get in interview with him reported afterwards that it was "like trying to talk about integral calculus with a person who didn't know his twelve-times table."

Lysenko, the editor believes, is not a mere cynical opportunist, deliberately uttering nonsense and untruth for personal profit. More probably he is a sincere fanatic, ruthless in making others swallow what he has already swallowed. But that makes him all the more to be feared, he did not hesitate to ruin the career of his early friend and sponsor, Academician Nikolai Vavilov, now presumed dead.

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WORLD'S FASTEST AIRLINER—This is Britain's four-engined all-jet airliner, the de Havilland "Comet." It is a low-wing monoplane with a moderate swept-back wing and is expected to have a cruising speed of 500 miles per hour at 40,000 feet. The small jet in the foreground was used to determine wing resistance, stress and strain for the new airliner.

PSYCHOLOGY

Picking Workers by Tests

➤ A LOT of accepted ideas about tests to select workers for various occupations have been exploded in a study by Dr Edwin E. Ghiselli, professor of psychology at the University of California.

For one thing, the result of a single test is seldom sufficient evidence for predicting whether an individual is suited for a particular kind of job. Whole batteries of tests will have to be developed if reasonable accuracy is to be achieved in personnel selection.

Dr. Ghiselli bases this conclusion on an evaluation of test scores for various occupations as compared with actual proficiency. The validity of the tests was only "moderate or low."

The psychologist also questioned the idea that intelligence tests are more effective in the "higher" than in the "lower" occupations. For example, the tests show up better in picking skilled workers than in picking salesmen.

He also found that there were wide

variations in the effectiveness of a given type of test within a single type of occupation. Intelligence tests, for example, varied over a wide range for business machine operators, in an occupation in which requirements would be expected to be rather uniform.

Psychologists have generally believed that a test has a certain degree of validity for a particular job and that variations from it are minor in nature. Dr. Ghiselli says just the reverse seems to be true: it is actually unusual when there is agreement in validity.

The psychologist studied results of testing in seven categories of occupations: clerical, sales, supervisory, protective service, skilled, semiskilled and unskilled. He obtained his data from psychological and technical reports from industry and governmental agencies. His results are published in a monograph by the University of California Press.

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CHEMISTRY

Algae for Food Explored

➤ FOOD-producing possibilities of a lower plant that can treble its bulk in 24 hours if supplied with constant illumination are being technically explored at the Stanford Research Institute, Palo Alto, Calif. Dr. J. E. Hobson, director of the Institute, stated. Dr. Hobson spoke as guest of Watson Davis, director of Science Service, on the Adventures in Science program, sent out over stations of the Columbia Broadcasting System.

The plant is the one-celled alga known to botanists as *Chlorella*. It is familiar as the cause of much of the green scum that forms on cattle ponds and other bodies of still water in warm weather.

First hint of the possibilities of this humble plant was obtained by Drs. H. A. Spöehr and Harold W. Milner of the Carnegie Institution of Washington, and Dr. Jack Myers of the University of Texas. They discovered that by controlling its chemical environment they could at will cause it to produce a very high yield of either protein or fat.

The Stanford Research Institute, financed by Research Corporation, was asked to probe into the economic potentialities of *Chlorella*. One of the first things they discovered was that it could be made to grow very much more rapidly by giving it 100 times as much carbon dioxide as occurs naturally in the air. This extra supply is readily obtainable from the waste gases from brewery vats or from the combustion gases escaping up factory chimneys.

The Institute has also undertaken a study of the fat or oil piled up in *Chlorella*'s tiny body when its nitrogen supply is kept short. This may prove useful in soapmaking or similar industries, thereby releasing animal or vegetable fats and oils now used there for other purposes. It is even possible that *Chlorella* oil may prove a good drying oil, which is always in demand by paint and varnish makers.

Chlorella protein, which accumulates when the plant is given an abundant supply of fixed nitrogen, is most likely to get into the human food cycle by way of livestock or poultry feed, being converted into milk, meat and eggs. There is the possibility, however, Dr. Hobson stated, that this protein may be processed into a form palatable enough for direct human consumption.

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VETERINARY MEDICINE

Cattle Stomach Lining Good For Foot-Mouth Vaccine

➤ FOOT-AND-MOUTH disease vaccine for the protection of livestock can be prepared more easily and cheaply than heretofore by culturing the virus on the lining of the rumen, or first stomach, of cattle. This new method of production has been developed by Drs. H. S. Frenkel and H. J. Frederiks at the National Veterinary Research Institute in Amsterdam.

Vaccines at present used in Mexico, South America and Europe are prepared from virus taken from the bodies of cattle infected with the disease. A recent step forward, still in the experimental stage, was the culturing of the virus on beef tongues fresh from the slaughter-house. Now the use of rumen tissue may replace that of tongue, especially since one rumen yields as much vaccine as four tongues.

Drs. Frenkel and Frederiks announce their results in a letter to the editor of the British scientific journal, *NATURE* (Aug. 6).

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INVENTION

New Auto Headlight Is Bright but Non-Blinding

➤ THE problem of getting a bright light on the road, yet not blinding other drivers with glare, is attacked in a new way by John T. Overstreet of San Antonio, Texas, who has just received U. S. patent 2,478,308 on his invention.

Just behind the front lens of his headlight Mr. Overstreet places a ring that supports a series of strips, slanted at an angle like the slats of a half-open Venetian blind, except that the strips are slightly down-curved rather than straight. The sides of the strips are silvered.

Angles and curvature of the strips are so arranged that the greater part of the light received from the lamp, either directly or by reflection from the parabolic mirror, is thrown directly forward to place strong illumination on the road. A smaller proportion is thrown upward and sideways, to give a general, non-glaring lighting effect.

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METEOROLOGY

April Sunshine Was More Intense Than Summer Rays

➤ OLD SOL is not entirely to blame for the hot weather of the present summer. The most intense rays of the year were in April, according to a "solar radiation recorder" on top of a General Electric Laboratory building in Schenectady, N. Y.

This year's unusual heat was caused by unusual atmospheric pressure conditions, G. E. meteorologists state. These prevent the moving in of cold air masses from the north. The radiation recorder shows that the sun has not been sending an out-of-the-common quantity of heat into the area this year.

The solar radiation recorder was developed by G. E. engineers several years ago. The portion of it which is struck by the rays of the sun is a small, glass vacuum tube, inside of which is a metal strip called a thermocouple. Electrical characteristics of the strip vary with the amount of solar heat striking it.

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PSYCHOLOGY

Study Why Men Succeed

A new institute has been established to assess the personalities of candidates for highly skilled jobs. Emphasis will be on why people succeed.

➤ **PSYCHOLOGISTS** at the University of California are preparing a unique approach to the study of man they will try to learn why men succeed instead of why they fail.

To carry out this task, an Institute of Personality Assessment and Research, funded by \$100,000 from the Rockefeller Foundation, has just been established on the Berkeley campus.

Head of the new institute is Dr. Donald W. MacKinnon, a key figure in the wartime personality assessment program of the Office of Strategic Services, which was famed for its methods of selecting men for specialized and hazardous overseas missions in World War II.

The new institute, of course, will not be concerned with picking spies and saboteurs, but rather with assessing the personalities of candidates for highly skilled occupations. Many of the OSS techniques will be used.

Dr. MacKinnon points out that the attention of psychologists has been directed primarily at the sick and abnormal. Little attention has been devoted to learning why

other men, who may have been subjected to just as many psychological difficulties as the sick and abnormal, are able to succeed and even to capitalize on their psychological problems.

"We hope to discover the factors that produce adjustment, happiness and effective living rather than illness, unhappiness and maladjustment," Dr. MacKinnon said.

The studies will be made in an "assessment community," where the "selectees" live with staff psychologists for a three-day period. Conditions in the community will be as natural and free of artificiality as possible, and subjects will be put through intensive evaluative procedures. The latter will include standard psychological tests, and situational tests in which the selectees can be observed as they react to environmental, social or occupational situations. In addition there will be psychiatric and personal history interviews and observation of day to day behavior.

Dr. MacKinnon and his colleagues will assess candidates for medical school, engineering curricula, and for other highly

skilled occupations. Selectees will be followed through school and their performance for a number of years after graduation will be studied in order to obtain information which may be helpful in the future in selecting candidates for the various professions.

The staff of the institute will represent a variety of skills in psychology and social science.

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ENTOMOLOGY

Insects Fed Micro-Doses of Poison with Microsyringe

➤ **DOSES** of DDT as small as a microgram (one thirty-millionth of an ounce) or even smaller can be fed to individual insects by means of a microsyringe devised by Dr. A. W. Woodrow, U. S. Department of Agriculture entomologist. The device consists of an ordinary medical glass syringe, with a screw-thread drive added to push the plunger by minute amounts.

Dr. Woodrow invented his microsyringe primarily for use in studying the effects of minimal doses of DDT on worker bees. It can, however, be adapted for other similar uses.

The new gadget is described and pictured in the journal, *SCIENCE* (Aug. 5).

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BIOCHEMISTRY

Analytic Device Measures Minute Elements of Cells

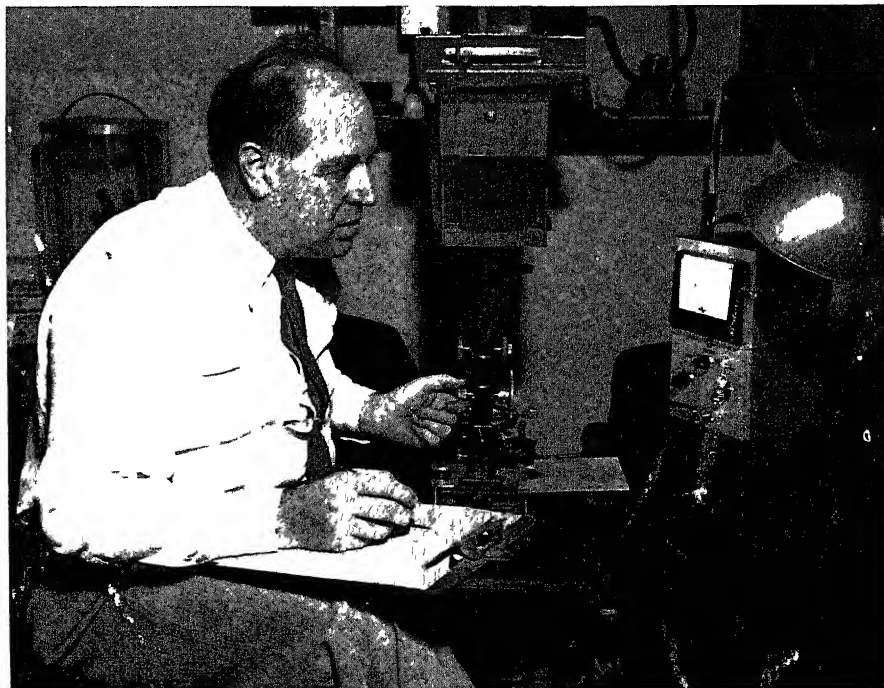
➤ **GENES**, the elusive heredity-determining chemical units whose existence has been mathematically proven but not visually demonstrated, may be among the minute cell-nucleus structures that will be tracked down by a new micro-analysis apparatus developed in the cytology laboratories of Columbia University, under the direction of Prof. Arthur W. Pollister.

The apparatus, though complex in principle, has been so simplified that any fairly well trained laboratory worker can use it under the higher powers of an ordinary microscope, Prof. Pollister declared.

The device operates by measuring, with ultra-sensitive photo-electric tubes, the amounts of light absorbed by various chemical components of the cell nucleus. One important compound, nucleic acid, has been shown to exist in a single cell in an amount less than one-trillionth of an ounce. Similarly "fantastically small" quantities of other chemical compounds can likewise be measured.

Research centers for the use of the new apparatus are being set up at Brookhaven National Laboratory, the Doctors' Hospital in Cleveland and a number of universities in this country, as well as at Mysore and Bombay universities in India.

Science News Letter, August 20, 1949



PROBING MAKE-UP OF CELLS—"Fantastically small" parts of individual cells can be studied with this photometric apparatus shown being used by Prof. Arthur W. Pollister of Columbia University, who directed the construction of the machine.

MEDICINE

Hayfever Drug Aids Victims Of Parkinson's Disease

➤ **RELIEF** for victims of shaking palsy or Parkinson's disease from the hayfever drug, thephorin, was reported by Dr F M Berger of the University of Rochester in the *NEW YORK STATE JOURNAL OF MEDICINE*

Of 24 patients treated, 13 showed improvement within one to two days, he said. Patients who had previously been unable to turn over in bed due to muscular weakness found that they could do so a couple of days after receiving the drug. It also enabled patients to feed and clothe themselves.

One patient confined to his chair for two years was able to return to work after treatment with the drug.

Dr Berger believes thephorin is the most effective drug found to date for this disease because it appears to be effective for all types of Parkinson's disease.

The drug was developed by Hoffman-LaRoche and the work was made possible by grants from the National Foundation for Infantile Paralysis and the Council on Pharmacy and Chemistry of the American Medical Association.

Science News Letter, August 20, 1949

MEDICINE

New Sedative Is Taken off Market

➤ **WITHDRAWAL** of a new sedative, Presdon, from the market followed reports of its possible ill effects, the Food and Drug Administration announced in Washington. The action was taken voluntarily by the manufacturer, Hoffman-LaRoche of Nutley, N J.

George P Larrick, associate Food and Drug Commissioner, said several reports indicating that the drug may be lowering the white blood count prompted the company to contact all doctors, hospitals, wholesalers, and retail druggists in the U S to stop using the drug.

The drug has been widely used in Europe for the last seven or eight years and is believed to have originated in Switzerland.

Science News Letter, August 20, 1949

WILDLIFE

Ewes Use Nursery School For Lambs, Not Mary's

➤ A **MOUNTAIN-TOP** nursery for little lambs—but not little Mary's—is being operated in a very human sort of way by the Mama Sheep (ewes to you) of Yellowstone's Mount Washburn.

This nursery for Rocky Mountain big-horn lambs, at an elevation of 10,317 feet, is organized in the same way as many neighborhood nurseries, the mothers take

turns "shepherding" the youngsters. This gives the ewes some time to themselves, just as it frees human mothers from the care of their youngsters for the morning or afternoon.

Discipline in the nursery is maintained by rebuking snorts or even a butt from the head of the ewe on duty for a particularly unruly lamb.

Pa Sheep, like human fathers, doesn't take much interest in this daytime baby-sitting. He's off on the peaks with the other rams. As a matter of fact, he doesn't take any interest in the ewes until fall, when he seeks their company.

Science News Letter, August 20, 1949

MEDICINE

Medical Science Scholar Awards To Be Granted

➤ **FIVE-YEAR** medical science scholar awards for young scientists interested in teaching or research in medicine will be granted to a third group of scholars by the John and Mary R. Markle Foundation in New York.

Each scholar will be a full-time faculty member at a medical school, and the school will receive a grant of \$25,000, payable at the rate of \$5,000 annually, for the scholar. A total of 29 scholars were named in 1948 and 1949, but the number to be appointed for next year has not been announced. Applications are to be made on or before Dec 1 to the foundation.

Science News Letter, August 20, 1949

ARCHAEOLOGY

Ancient Burial Mounds In Japan To Be Excavated

➤ **BREAKDOWN** of the formal emperor-worship system in Japan releases for scientific investigation some of the biggest earthen burial mounds in the world. Until now, digging has been forbidden because they are regarded (possibly correctly) as the tombs of ancestors of the present reigning house in Japan, writes Edwin O Reischauer to the American research journal, *ARCHAEOLOGY* (Summer).

Excavation of the great mound believed to be the burial-place of the Emperor Nintoku, who probably reigned about 400 A D, is the first project planned. Approval of the present emperor is indicated by the report that his younger brother, Prince Takamatsu, is to be titular head of the undertaking.

No one knows as yet, of course, what will be revealed by the diggers' spades. However, since archaeological evidence is strong that the present Japanese culture was initiated early in the Christian era by an invasion of horse-riding warriors from Korea, discovery of Korean, or Korean-like, relics in the mounds would not be surprising.

Science News Letter, August 20, 1949

MEDICINE

Polio Isolation Period Of Only One Week Urged

➤ **POLIO** victims would be isolated for only one week after contracting the disease, or for the duration of their fever if it lasts longer, under recommendations made by the National Conference on Recommended Practices for the Control of Poliomyelitis announced in New York.

Twenty medical authorities who met last June in Ann Arbor, Mich, under the sponsorship of the National Foundation for Infantile Paralysis, developed the recommendations and called the present quarantine regulations unwarranted.

They stated that quarantine for polio is not of proven value.

The medical scientists pointed out in a guide prepared for local health officers that these regulations may create fear or hysteria during an epidemic and are wasteful as far as hospital facilities, personnel and family finances are concerned. They also cautioned that a long period of isolation creates barriers to giving the patient the treatment he needs in the early stages of the disease.

Schools were urged to open on schedule except in two situations: if children were transported to school from widely separated areas, and if, in addition to not reopening the schools, children were kept from coming in contact at such places as theaters, picnic and play grounds, beaches and Sunday schools.

Science News Letter, August 20, 1949

ASTRONOMY

Rocket Speeds Dwarfed By Newly-Discovered Nova

➤ **EXPLODING** at the velocity of 550,000 miles per hour, the "new" star, or nova, recently discovered in France, is still relatively bright and is being observed by most of the leading American observatories (*See SNL, Aug 13, p 104*).

The University of Michigan reports the 250-kilometers-per-second speed of the star's expanding shell, which makes earthly rocket speeds small in comparison. McDonald Observatory in Texas also reports to the Harvard Clearing center for astronomical messages in the U S, a similar great shift in the absorption lines of the spectrum indicating the high velocity.

The new star is staying bright unusually long, as it is still reported as eighth magnitude. It is in the constellation of Scutum, the shield.

Science News Letter, August 20, 1949

MEDICINE

One Cold Wave Process Is Absolved of Ill-Effects

➤ A COLD wave home permanent has been absolved of causing ill effects to users by a team of physicians reporting in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Aug 13)

The home wave used in the new tests has the same ingredients as other cold wave processes but no generalization can be made since these other lotions may have different concentrations of the necessary chemicals

The new evidence concerning its safety is based on patch tests made on 1,200 volunteers. They were a representative group of many varying conditions. Some had skin infections from other causes, some worked with the solutions in the factory, and some had had one to 20 previous cold waves.

In addition, to make the test absolutely fair, the beauty clinic operators were asked to let the scalps of the volunteers be thoroughly wetted by the waving lotion.

The results revealed that the cold wave preparation caused few skin irritations and very little sensitization. Previous criticism had also been based on its destructive action on liver cells. In this study no such harmful effect was found.

The work was done by Drs. Howard T. Behrman and Frank C. Combes of the New York University College of Medicine, Dr. Michael G. Mulinos of New York Medical College, Dr. Gustav Weissberg, Dr. Jerome Kaufman, Dr. Herbert Fishbein, and Willard F. Greenwald of New York, and Dr. Milton M. Huitwitz of St. Paul. The tests were conducted at Bellevue Hospital.

Science News Letter, August 20, 1949

INVENTION

Newly Patented Gadget Butters Corn-on-Cob

➤ A GOLF putter and a knife used for buttering corn-on-the-cob are alike in one respect, both are utterly unsuited for the purpose. Realization of this, as regards the knife at least, moved a Corn-Belt inventor, M. N. Mosel of Fulton, Mo., to do something about it. He came up with a special gadget that will apply the butter where it is wanted, without dropping it in pieces all over the plate, and on this he has just been granted U. S. patent 2,478,122.

The device is really quite simple. It is a square piece of metal or any other suitable material, arched underneath so that

it will ride on the corn ear, saddle-fashion. In the middle is a recess of the right size to take a pat of butter.

Turned upside down, it rests on four little legs until the butter is inserted. Then it is inverted over the corn, and the legs become a grip for the fingers of the user, as he slides it along over the ear, turning the latter until every grain is lusciously buttered.

It really ought to save a lot of time now wasted in attempts to butter corn with a knife—time that can henceforth be devoted to the serious business of eating corn.

Science News Letter, August 20, 1949

AGRICULTURE

Hybrid Seed Corn Grown Without Detasseling

➤ HYBRID seed corn can now be grown without the laborious, and often injurious, detasseling process. This has been made possible by the development of an inbred strain that produces no pollen. Detasseling, ordinarily practiced to prevent the corn plants intended to be the female parents of hybrid seed from pollinizing themselves, thereby becomes unnecessary.

The new pollenless strain was developed at the Connecticut Agricultural Experiment Station in New Haven, by Drs. Donald F. Jones and P. C. Mungelsdorf. Dr. Jones was the originator of the double-cross system now generally used in producing hybrid seed corn. Dr. Mungelsdorf is now a member of the Harvard University faculty.

The new production method is described in a new bulletin of the experiment station, written by Dr. Jones and Dr. Herbert L. Everett.

Science News Letter, August 20, 1949

COMMUNICATIONS

Airlines Require Large Network of Telegraph Wire

➤ AIRLINES as well as railroads require vast mileage of telephone wire for flight operations and other purposes, and what is claimed to be the largest communications network of any company in the world is now completed and in operation by United Air Lines, which centers operational activities in Denver.

Extending from this operational base, the company has almost 12,000 miles of private telephone lines, and 20,000 miles of leased teletype wire, plus a vast array of plane-to-ground radio facilities.

Control of all cargo and passenger space is now centralized in Denver. Some 6,000 miles of telephone wire for payload control link 25 cities directly with the central office. Flight operations utilize about 4,000 miles of private wire, which also terminate there. A 1,900-mile administrative line connects executive offices in Chicago with the Denver center, and with the company's maintenance base in San Francisco.

Science News Letter, August 20, 1949

BIOCHEMISTRY

Cud-Chewing Animals Form Amino Acids from Urea

➤ AMINO acids, the chemical building blocks out of which proteins are formed, can be produced in the rumen, or first division of the compound stomach, of cud-chewing animals from the supposedly non-nutrient compound, urea. This has been demonstrated in experiments on sheep and goats at Cornell University, Ithaca, N. Y., by a five-man research team led by Prof. J. K. Loosli.

The animals were fed on a synthetic diet containing no proteins and only incidental traces of amino acids, with urea as the only nitrogenous compound present. Analyses of material taken from their rumens, as well as of their body wastes, showed the presence of ten different amino acids, in considerable quantities. The animals also gained weight steadily, indicating the synthesis of the amino acids into proteins, and these into living body materials.

Associated with Prof. Loosli in the work were Profs. H. H. Williams and L. A. Maynard and Drs. W. E. Thomas and Fent H. Ferris. Their report appears in the journal SCIENCE (Aug. 5).

Science News Letter, August 20, 1949

BIOCHEMISTRY

Growth-Control Substances Present in Seaweed

➤ SEAWEEDS produce growth-control substance, and respond to it in very much the same manner as the higher land plants. This has been demonstrated in two ways by Dr. Louis G. Williams of Furman University of Greenville, S. C., who carried on his experiments at the Woods Hole, Mass., Marine Biological Laboratory.

In one series of experiments, Dr. Williams cuts disks out of the broad-bladed seaweed known as Laminaria, and kept them in beakers of sea water containing various dilutions of the synthetic growth-control substance, indole acetic acid. They responded to the lower concentrations by growing healthily, but became unhealthy and disintegrated when there was too much of the compound. This agrees very well with what is known about growth-hormone effects on higher plants, which are stimulated by low dosages and injured or killed by overdoses, as in 2,4-D treatment of weeds.

In a second experimental series, Dr. Williams squeezed the juice out of Laminaria tissue, made it into a paste with lanolin, and applied the paste to the sides of oat seedlings. These responded by bending over, indicating increased growth rates where the Laminaria juice was at work on their cells.

Details of the experiments are reported in the journal SCIENCE (Aug. 12).

Science News Letter, August 20, 1949

PSYCHOLOGY

Inner Secrets Revealed

Pictures can reveal to the psychologists the unconscious troubles in the minds of teen-agers such as dangerous aggressive drives, shyness, and sex conflicts.

By MARJORIE VAN DE WATER

➤ THE inner secrets of your personality can be told through pictures such as the two here. The pictures don't look like you, of course. But if you made up a story to fit the picture and to tell it to a psychologist, he would know a lot about your hidden feelings and drives, even if these are unknown to your own conscious mind.

The pictures and others like them are a series for a new test to learn more about the troubled, inner feelings of adolescents. With the help of the pictures psychologists might be able to pick up dangerously aggressive drives, shyness that can ruin a youngster's life if not detected, sex conflicts and many other important facts about our teen-agers.

Use of pictures for this purpose was devised by Dr. Percival M. Symonds of Teachers College, Columbia University.

If you want to get an idea of how the test works, try it on yourself.

Look at the picture below. What do you see in it? Perhaps it makes you think of the preparations in a family for high school graduation or some other special occasion. Or perhaps the mother is getting one of her daughters ready for her first dance. But what is the other girl thinking? Why is she not taking part in the preparations?

Build Story

Now, show the picture to a teen-age boy (or girl) and ask him to build a story around it. You may be surprised at what he tells you. When high school boys and girls give free rein to their imaginations, they dream up a world filled with aggression, Dr. Symonds found.

Here is what one boy, Jimmy, a 17-year-old student of the academic course, told about the picture of the two girls and woman.

"There is a Cinderella situation here. One girl is the mother's favorite. The other one is neglected. They grow up like that, one disliking the other. One of them marries the handsomest fellow in town, the other one just gets a local boy, no one important. The marriage finally ends in a terrible tragedy. The favorite is killed by the neglected girl because of jealousy. Naturally, the husband of the favorite seeks revenge, and he goes to the house where the other girl lives and makes an attempt to murder her. He is killed by this girl's husband, and the other two are accused of murder. They're executed. The mother realizes that her favoritism caused sorrow to about 12 different people, the families of the dead."

But don't picture Jimmy, on the basis of this story of his, as a teen-age gangster, whose literary fare consists solely of the more lurid comics. He is a well-adjusted boy with an excellent reputation in school with his teachers. He is fond of reading poetry and plays and likes to see plays. He collects books and would like to own complete sets of the poets and classics. Chief worry of his parents about him is that his popularity keeps him from spending enough time on his school work. He speaks warmly of his father and mother and calls them pals.

Reveal Character

The stories thought up by the boys and girls do reveal their character—not a single one like this but a series of them—but they show the deep-seated tendencies, not the surface appearance. In general, when a theme is exaggerated in the stories there is an absence of this trend in the personality of the individual and vice versa, Dr. Symonds found.

Individuals with stories filled with violence and hostile aggression turned out to be in real life sissies, ingratiating, inhibited and docile. Those who tell bizarre, fantastic stories containing elements of mystery turn out to be quiet, lazy, indifferent and

without initiative or queer, nervous and immature.

Perhaps you would like to see what a neurotic boy with delinquent trends does with the same picture. This is the story thought up by Jack, 15-year-old junior high student.

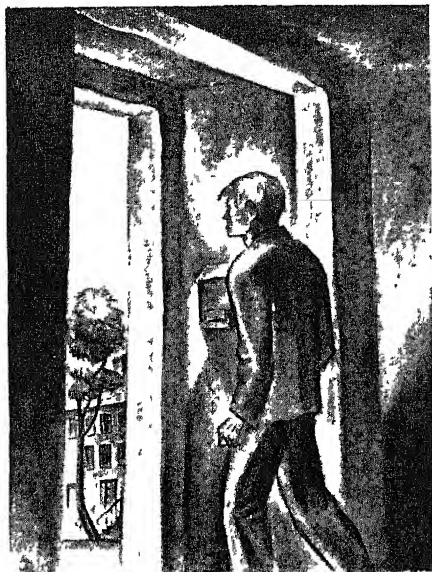
"This woman had two girls. One was younger than her sister. Her mother always liked the oldest girl. So she bought her all new clothes and gave her the best of everything. She gave the younger girl the old clothes which her sister had worn out. The mother always made her do housework while her sister went out with boys. The mother always thought that the oldest girl would marry a rich guy and she'd live with her in luxury. But she got fooled, for when this girl married, she didn't care nothing about her mother. She and her husband moved. The mother didn't know where for she never heard from her. The youngest girl was just going with boys. She stayed with her mother and helped her all she could. When she got married, she done the opposite of the other girl and took the mother into her home. The mother was always sorry she never favored the little girl."

Both boys start out with the same situation of sister rivalry, but how different is the ending!

Now look at the picture on the opposite page. What does it make you think of? You will undoubtedly notice the clenched fist and set jaw and think that the young man is angry and perhaps is leaving home.

Here is what Jimmy saw





"This man works for a rich farmer. He has been working for him for years. He has been underpaid, beaten, treated mean, but for some reason he never has left the place. The reason is that when he was a little boy he was first brought to this place by his father. He has grown up with the present farmer, his boss now, and the present farmer's sister. As he grew up he grew to love the farmer's sister, and the farmer hates him because of all the attention given him. He is strong and handsome. The farmer hates him because he himself is frail and jealous of the other man's strength. He lived under these cruel conditions, beaten, all because of his love for the present farmer's sister, who had great influence over the farmer, who had great influence over his sister, was forcing her to marry some man to get his money. This was the day of the wedding. He had just heard that the farmer's sister was found dead in her room. She had killed herself to avoid marriage. The man realized that now he had no reason to stay and that at last he could have revenge without hurting the one he loved. He went into the house and killed the farmer he had grown up with—choked him to death with the powerful muscles of his hands—muscles that the farmer had forced him to build. He did not try to escape from the police after they found that he had murdered the farmer. He confessed to the crime and was hung on a tree right in front of the great house he should have owned. He was buried alongside of the farmer. The farmer's grave separated his and the girl's. They were separated in death even as in life."

When asked where he got the idea for the story, Jimmy said "The beginning is taken almost directly from 'Wuthering Heights'. The end is more my own—more tragic."

Jack also sees a crime story in this picture, but his version, inspired in part by movies and books, is much less violent than Jimmy's and again has a happy ending.

"This boy was brought up in a bad neighborhood. He was adopted by some rich people. While living there, he was influenced by a gang to tell them where the safe was and the combination, for the people trusted him with the combination. The gangsters got caught and squealed on the kid. He was sent to the reformatory. The people wanted to give him another chance, because they liked him. They thought it wasn't his fault. After two years in the reform school he was given a pardon. He got out and now he's working, hoping he can make a new start. He turned out to be a good citizen."

In the stories of these high school boys and girls, aggression is followed by punishment in monotonous sequence, Dr. Symonds found. A sequence repeated over and over again was to have the aggression of robbery or personal attack followed by the arrival of police, arrest, trial, conviction and punishment. Punishment meted out by these high school authors is severe—often life imprisonment or the electric chair.

Aggression Themes

Stories were obtained from 20 boys and 20 girls on 42 pictures. Every boy and girl told at least three stories including themes of aggression. But love was a common theme, too. Altogether 17 boys and 19 girls included at least three themes of love in their stories.

Dr. Symonds warns against using stories such as these to divine anything about the life history of the boy or girl telling them. The story teller does put himself into the tale, but caution must be used in interpretation. The boy or girl author may appear in the role of any, or all the characters of his creation. And it is not the least difficult for him to identify himself with a character of the opposite sex or a different age level. In fact, stories contain various displacements and disguises to hide the identity of the actual persons toward whom the feelings expressed in the story are directed in real life.

The psychologist can learn much about personality from the study of such stories. Dr. Symonds concludes, but he must proceed by indirection and must learn all he can about the individual before attempting to interpret his phantasies.

The complete set of the pictures drawn for the purpose by the artist Lynd Ward, together with the results of Dr. Symonds' study of the imaginings of high school boys and girls, are contained in a new book just published, *ADOLESCENT FANTASY* (Columbia University Press).

Science News Letter, August 20, 1949

BOTANY-CHEMISTRY

Heavy Doses Of 2,4-D Kill Water Hyacinth

➤ WATER hyacinth, at once the most troublesome and the most beautiful of the South's aquatic weeds, can be effectively controlled with heavy treatments of the

weed-killing chemical, 2,4-D, where lighter treatments have failed in the past. It promises to rid Southern rivers and lakes of blocking mats of vegetation that do tens of millions of dollars' worth of damage every year.

A team composed of scientists from Tulane University, the Boyce Thompson Institute for Plant Research and the Army Engineer Corps have been conducting experiments under controlled field conditions. They have found that a spray laying down the equivalent of eight pounds of 2,4-D per acre will kill the water hyacinth and cause the masses to sink. It is important that this sinking occur, floating masses of dead hyacinth would be almost as bad as the living mats, so far as channel obstruction is concerned.

Water hyacinth is a tropical plant brought to this country originally as an ornamental. It has spikes of beautiful lavender flowers, and floats by means of air-containing pithy swellings in its leaf-stems, while its long roots trail in the water. Besides blocking navigation on rivers and lakes, it ruins them as habitats for ducks and fish, and also offers favorable breeding spots for some species of mosquitoes.

Science News Letter, August 20, 1949

Words in Science— ANTI-HISTAMINE

➤ HISTAMINE—you say it his-tam-in, stressing the his—is a chemical normally formed in the body. Among other actions, it stimulates stomach secretion.

It is now believed that release of too much histamine in the body can play a part in allergies and can also bring on vomiting and diarrhea.

So the drugs now commonly used against hay fever, asthma, hives and other allergies are anti-histamine chemicals, they counteract the histamine in the body.

Among the anti-histamine chemicals are benadryl, thephorin, trimeton, and thenylcne hydrochloride.

Science News Letter, August 20, 1949

F you are frustrated in acquiring distinguished but inexpensive books for your science library, you will want a copy of Harry Grace Lemon's *FROM GALILEO TO COSMIC RAYS* for only 98¢. This 450-page work was published at three dollars and provides an intelligent, lucid account of the evolution of physics through Galileo, Newton, Boyle, Dalton, Einstein, et al. Gerald Wendt in the *N. Y. Herald Tribune* says, "In all the years that I have been reviewing scientific books I have often been fascinated but I have seldom used exclamation points. But this book deserves a fanfare." Two other noted books now offered by us at drastically reduced prices: Warren Weaver's *THE SCIENTISTS SPEAK* at 98¢ (regularly \$3.75) and Raymond Ditmars' *THRILLS OF A NATURALIST'S QUEST* at 98¢ (originally \$3.50). Add 7¢ postage per book ordered. Ten-day cash-back guarantee. Send for FREE CATALOG listing many other outstanding titles in SCIENCE, PHYSICS, NATURE and APPLIED MATHEMATICS. Savings up to 75%.

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ENGINEERING

Deeper Oil Well Drilling

➤ NEW developments in drilling 20,000-foot wells in the search for oil were discussed at the Lake Success, N. Y., meeting of the United Nations Scientific Conference on the Conservation and Utilization of Resources (UNSCCOUR), being held this month, by I. S. Salmikov of the Standard Oil Company.

A 1,500-foot well was regarded as deep a half century or so ago, and drilling to that depth was a relatively easy job. America's first oil well, bored at Titusville, Pa., soon after the discovery of oil in 1859, was 695 feet in depth. Only 20 years ago, a 9,000-foot well was considered an epic achievement. The first 15,000-foot well was drilled in 1938. Since World War II, four wells in succession have set new records below that depth, and a well in Wyoming, not yet completed, is now below the 20,000-foot mark.

The first oil-well-drilling equipment was the cable tool rig which, in one form or another, has been used to punch holes in the ground since the beginning of recorded history, he stated. The standard cable tool method was used in the United States

almost exclusively until 1900. A year later the rotary drilling method came into general use in this country. But although steady improvements were made, pre-war equipment is not satisfactory to obtain the great depths of these post-war deep wells.

The most important developments in rotary drilling, Mr. Salmikov told the scientists, are in the unitization and portability of drilling rigs and equipment, better quality steel for drilling equipment, improved designs, improvement in drilling

muds, better understanding of hydraulics in mud systems, and proper application of weight on the bit and rotating speeds. Unitization and portability have made drilling more economical but have not added much to the depth problem.

War-developed steels of great strength are now in use in well drilling. Lightweight, high-speed diesel units now provide power. Hydraulic drives, in the form of hydraulic couplings and torque converters, radially operated air clutches for use in frequently engaged and disengaged rig drives, air controls of engine throttles, and other services have also been developed by the oil industry in recent years.

Science News Letter, August 20, 1949

AERONAUTICS

Design Slow-Speed Plane

➤ SLOWNESS, not speed, is the feature of a new airplane produced by a professor of Massachusetts Institute of Technology and a professor of Harvard which has already demonstrated its ability to land and take off from an area no larger than a tennis court, it was revealed.

A new name has been coined for the craft. It is the Helioplane, because its take-off and landing characteristics approach that of the helicopter. However, it is a high-wing monoplane and in appearance is similar to that of other two-passenger private craft. The model now in use, which made its first flight three months ago, was built by the Helio Corporation of Norwood, Mass., with funds and under the supervision of the two college instructors.

The plane was designed by Otto C. Koppen, a pilot now a professor of aeronautical engineering at M. I. T., to specifications laid out by Dr. Lynn Bollinger, of Harvard, a former pilot and airport operator. Its first flight was made with Prof. Koppen at the controls. The inventors plan to license the design for commercial manufacture after a small number have been built and they are certain that the plane has been perfected.

The new plane can fly at a minimum speed of 27 miles an hour, the inventors claim. It can do this with no risk of stalling or spinning, they say. Yet its high-speed and load-carrying characteristics are comparable with those of an efficient modern plane of the same size. It is designed to clear a five-story structure only 100 yards from its starting point.

The Helioplane is fully equipped with starter, generator, radio, and the crosswind landing gear, sponsored by the U. S. Civil Aeronautics Administration, that makes landing on a fixed runway possible regardless of the direction of the wind. It has an unusually large two-bladed Aeromatic constant-speed high-lift propeller, and is equipped with an 85-horsepower

Continental engine.

Another feature of the new plane, an important asset if tiny airstrips in the heart of a built-up area are to be used, is its quietness. It makes but little more noise than an automobile. Profiting by experimental work of the National Advisory Committee for Aeronautics, the Helioplane uses different mechanical methods for restricting propeller noise, and the engine jacket is eliminated by a "hush-box" which Prof. Koppen developed and patented several years ago.

Science News Letter, August 20, 1949

ZOOLOGY

Oysters Not so Dumb; Choosy About Food

➤ OYSTERS aren't as dumb as the proverb would have us believe. They know what they like.

Contrary to a widely-advocated view that oysters will swallow any microscopic particle if it is in the size range of their accustomed food plants, Dr. Victor L. Loosanoff of the U. S. Fish and Wildlife Service laboratory in Milford, Conn., has found that the tasty mollusks are a bit choosy about what they will eat.

He tried suspensions of yeast cells on some batches of experimental oysters. There is nothing unwholesome about yeast, but the oysters weren't used to it, so they wadded up the cells and spewed them out again.

Oysters exercised this selectivity on mixed lots of foodplant cells containing also quantities of purple bacteria which they didn't like. Here again they wadded up the purple cells and rejected them, but swallowed and digested the plant cells that make good oyster rations.

Dr. Loosanoff tells of his observations in the journal, SCIENCE (July 29).

Science News Letter, August 20, 1949

LINGUAPHONE



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ENGINEERING

Coke-Briquette Process

➤ NORWAY will be able to meet its own needs for coke and liquid motor fuels by a new electrical method developed in that country for the production of high-quality coke briquettes from non-coking coal and also gases that can be converted into gasoline and diesel oil

The new process, now under development, was discussed at the meeting of the United Nations Scientific Conference on the Conservation and Utilization of Resources (UNSCCVR) at Lake Success, N Y, by Olaf Jensen of Oslo, Norway

Norway already has a rather plentiful supply of hydroelectrical energy and much more can be developed as needed. The coal to be used is from the islands of Spitsbergen (Svalbard) far to the north in the Arctic Ocean, where an estimated amount of 8,000,000,000 tons are available. The Spitsbergen coal is unsuitable for coke-making in the usual type of coke ovens.

In the new process, the coal is crushed and then briquetted. In one method the crushing is carried to pulverization and the briquettes formed by high pressure

without use of a binder. In a second method, the coal is not so finely crushed and formed into briquettes at relatively low pressure with concentrated sulfite waste liquor as a binder. The choice of process will depend upon economic factors, such as the availability and cost of the sulfite waste.

The coal briquettes are then pre-heated to 150 to 200 degrees Centigrade. It is a well known fact, Mr. Jensen said, that by a sufficiently slow rate of heating, coal briquettes can be made into high-temperature coke without cracking, deformation or fusing together. The resulting coke-briquettes have high mechanical strength, a dense structure and are far more re-active than standard high temperature coke.

By-products of the process are coal tar and gas. The gas is entirely suitable for conversion into gasoline and diesel fuel by processes well known in America. Some 1,500,000 tons of coal will yield approximately 700,000 tons of coke, 750,000 barrels of tar, and 2,000,000 barrels of gasoline and fuel oil, he stated.

Science News Letter, August 20, 1949

range of astronomers' telescopes, but it will be back for more 'scope photos in the spring of 1951.

The object was first spotted at the California observatory on the night of July 25, by Dr. C. A. Wirtanen by studying photographic plates. Believed to be an asteroid, or minor planet, the object was far too faint to be seen by the naked eye.

Dr. Alan D. Maxwell of Howard University has calculated the orbit, or path of the object around the sun, and finds that it probably takes about 20 months to make a complete trip. From this, he estimates that earth-bound astronomers ought to be able to photograph the faint object for a short period every two and one-half years, or next time in March or April of 1951.

"Remarkable thing is that it has not been found before," comments Dr. Maxwell.

Object Wirtanen, as the new find is called, comes to about 28,000,000 miles from the earth at its closest approach, where it was about Aug. 1. Closest approach it makes to sun is about 120,000,000 miles, the new calculations indicate.

Orbit of object Wirtanen falls between the paths of the earth and Mars around the sun.

Science News Letter, August 20, 1949

FORESTRY

Importance of Forestry

➤ THE importance of forestry on the present and future world was emphasized at the meeting of the United Nations Scientific Conference on the Conservation and Utilization of Resources (UNSCCVR) this month at Lake Success, N Y, by several scientists from various parts of the world. Papers ranged from the necessity of reforestation to proper forest management.

Naturalists are convinced of the beneficial effects of forests on the meteorological and hydrological conditions, and the large part that properly distributed and well maintained forests play in the well-being of rural and agricultural communities. The UNSCCVR was told by C. R. Ranganaathan of the Indian Forest Service, it was revealed.

Historical evidence from many countries proves conclusively, he stated, that the soil and physical conditions deteriorate with the destruction of forests or their degradation through excessive grazing or burning. Forests are important basic agents. The development of the soil and the natural vegetation it supports are co-ordinate and interdependent. The moderating influence of forests on the temperature is distinctly noticeable. Trees act as pumps, tapping the ground water from considerable depths and transferring it to the air. Forests affect the ground water-table according to the initial nature of the soil and the topography. In dry soils and on slopes they increase water-

holding capacity, but in ground liable to marshy conditions, the trees tend to lower the water table and exercise a draining effect.

The danger of a shortage of wood which alarmed Western and Central Europe at the close of the Middle Ages was largely responsible for the forestry practices developed in the 18th century which are based upon conservation. The meeting was told by Stefan Duschek of Linz, Austria. The principles developed in the best European forestry practices are now needed throughout the world.

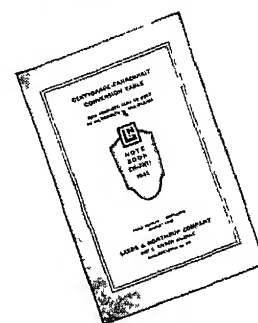
The function of conservation is to obtain wood in such quantities and by such means that future generations are insured a constant supply and one as stable and plentiful as possible, according to Mr. Duschek. It is extremely important for young countries to allocate their forest areas appropriately among the different types of land utilization, and to graduate their cultivation systems according to the plan.

Science News Letter, August 20, 1949

ASTRONOMY

Fast-Moving Sky Object Will Be Back in 1951

➤ THE fast-moving sky object discovered at the University of California's Lick Observatory late in July is moving out of the



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Thermothanatos

➤ DINOSAURS died off leaving no heirs of their line to dispute with the upstart mammals their once-held dominion of the earth, not because the climate became too cold but because it got too hot for them. The heat may have killed some of them directly, but more likely it wrought their extinction indirectly, through making the males incapable of reproduction

This thesis, radically contradictory to the older doctrine that the great reptiles were simply frozen out by some long-gone ice age, is advanced by Prof. Raymond R. Cowles of the University of California at Los Angeles. He has devoted a good deal of research to the phenomena of heat-responses in modern cold-blooded animals, especially reptiles, and he reasons by analogy with what he has actually observed under field conditions.

Years ago, Prof. Cowles came to question the time-worn simile, "happy as a lizard on a hot rock," because the lizards he had seen on hot rocks were distinctly not happy. To begin with, lizards (or snakes) are rarely seen on rocks that are really hot. Few reptiles are to be seen in the full glare of the noonday sun in the desert. They are down in their burrows, or hiding in shady spots. The time for them to be abroad is in the forenoon and late afternoon, when the sand and rocks are merely pleasantly warm.

The California zoologist went beyond simple field observations. He penned reptiles of various kinds on areas of rock and sand and kept them there as daytime temperatures rose to their simmering maxima. The poor creatures showed signs of increasing

distress, ending in prostration. If he did not let them escape in time, they died.

The point is, that these so-called cold-blooded animals become more hot-blooded than warm-blooded animals when they are exposed to too much heat. They do not have the thermo-regulatory mechanisms possessed by the later-arriving, more highly evolved mammals and birds. If the hot rock changes from a nice, warm basking-place to a 120-degree griddle, they die of what amounts to an extreme fever.

Even without waiting for that, however, a male reptile, with its sex glands carried within its over-heated body, can suffer heat-sterilization if caught by a too-high temperature. Crocodilians and sea-turtles keep safely cool in the water; terrestrial snakes and lizards are small enough to find saving shelter. But the huge, lumbering saurians of the late Cretaceous, kept constantly just a little too warm by an endless August of world-wide tropical conditions, may very well have become incapable of fertilizing their mates' eggs. So, like many another ponderous aristocracy, they may well have lost their world simply through lack of offspring.

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GEOLOGY

Reporting Tidal Waves

➤ SAFETY in the Pacific area will be promoted by Pacific and Alaskan stations maintained by the U. S. Civil Aeronautics Administration which have now been made a part of a system for detecting and reporting tidal waves resulting from undersea earthquakes. The CAA contribution will be largely the use of its continuous communications channels in the area.

In this work, the CAA is now cooperating with the U. S. Coast and Geodetic Survey and the Military services in a far-flung program of observation and reporting. Shores in the path of such waves will be warned so that steps can be taken to prevent loss of life and property.

These tidal waves are more properly called seismic waves. They are relatively low in height and of great length, and are not easily detected by aircraft and ships at sea or by normal eyesight observation. They may attain speeds of more than 400 miles per hour and cause terrific damage when they roll up unexpectedly on islands or the shoreline of mainlands. The Honolulu disaster a few years ago is an example of their power to destroy.

Special instruments employed by strategically located tide gauge stations are designed to screen the normal rise and fall of sea water and detect a sustained rise which may be a sea wave. The Honolulu magnetic and seismological observatory is the focal point of the detecting and warning system. When earthquake disturbances are noted at west coast observatories, re-

ports are made to Honolulu. Tide gauge stations in the Alaska area and on islands throughout the Pacific are alerted to make continuous observations. Once a sea wave is detected, all areas are warned to prepare for possible consequences.

Science News Letter, August 20, 1949

ZOOLOGY

Mouse-Eating Frogs Added To National Museum

➤ MOUSE-eating frogs, that bellow fiercely like bulls when disturbed, have been added to the zoological collections at the U. S. National Museum in Washington. They come from the rainy mountains of tropical Brazil. Their mouths are so wide that it is no trick at all for them to swallow mice. They also gulp down other frogs.

They might be described as Mr. (and Mrs.) Six-by-Six, both sexes are about the same size, six inches long in the body and almost as wide. They won't budge even for relatively gigantic visitors like human beings, but merely swell up balloon-wise and sound off with their startling bellowing.

Their daunting appearance is enhanced by the possession of what seem to be horns. However, states Dr. Doris Cochran of the Museum staff, these apparent horns are merely outgrowths of the skin, and have no combat value whatever.

Science News Letter, August 20, 1949

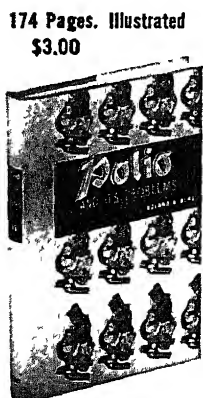
The Biography of a Disease

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Books of the Week

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AMERICAN PERMIAN NAUTILOIDS—A K Miller and Walter Youngquist—*Geological Society of America*, 218 p, illus, \$3.60 Although much has been written on ammonoids of the Permian, this is one of the first monographs on the nautiloids Helpful to geologists and paleontologists

CHANGE OF LIFE—F S Edsall—*Woman's Press*, 127 p, illus, \$2.00 A woman physician and mother writes this little volume in which the average woman will find much useful information on the problems that the menopause brings and how to solve them

CONTROLLING FACTORS IN ECONOMIC DEVELOPMENT—Harold G Moulton—*The Brookings Institution*, 397 p, \$4.00 Fundamentals underlying economic advancement

FACTORS OF EVOLUTION The Theory of Stabilizing Selection—I I Schmalhausen—*Blakiston*, 327 p, illus, \$6.00 An analysis of the evolutionary relations in terms of genetic causation The author, an elected member of the USSR Academy of Science, is reported to be expelled for not following Lysenko's interpretation of genetics Translated from the Russian by Isadore Dordick

THE FIRST BOOK OF BUGS—Margaret Williamson—*Watts*, 44 p, illus, \$1.50 Here is a book full of creatures, of which some are already familiar to any boy or girl, others he has yet to meet—crickets, moths, spiders, ants, daddy-long-legs and many others

THE INSECT WORLD OF J HENRI FABRE—Edwin Way Teale, Ed—*Dodd*, 332 p, illus, \$3.50 The best of Fabre's writings are brought together into one compact volume The record of the Pine Processionary caterpillars, which has been up to now out-of-print, is included

THE PLANT IN MY WINDOW—Ross Parmenter—*Crowell*, 148 p, illus, \$2.50 A story of a city dweller who adopted a plant left behind by a former tenant Besides telling of the growth of the plant, it also tells of the intellectual growth of the tenant

REVISION OF THE FAMILIES AND GENERA OF THE DEVONIAN TETRACORALS—Edwin C Stumm—*Geological Society of America*, 92

p, illus, \$2.00 A detailed study of the families, sub-families, and genera

SEDIMENTARY FACIES IN GEOLOGIC HISTORY—Chester R Longwell, Chairman—*Geological Society of America*, 171 p, illus, \$1.75 Conference at the meeting of the Geological Society held in New York, November 11, 1948 In this book the focus of the principal papers is on the geologic record, but interpretation is sought through allied disciplines and techniques

THE SINGLE WOMAN—Robert Latou Dickinson and Lura Beam—*Williams & Wilkins*, 469 p, \$4.00 A reprint of a medical analysis of a single woman's problems The basic material for the book consists of 1078 cases gathered over a period of 40 years

SUBSURFACE GEOLOGIC METHODS—L W LeRoy and Harry M Crain, Eds—*Colorado School of Mines*, 826 p, illus, paper, \$6.00 Volume 44, number 3 of the *Quarterly*, is a compilation of all the various subsurface geologic methods known at the present time

THE TERPENES, Vol II—Sir John Simonsen—*Cambridge University Press*, 2nd ed, 219 p, illus, \$8.50 This volume includes material up through 1947 and a few references to 1948 literature on bicyclic terpenes For the professional man

TELEVISION WORKS LIKE THIS—Jeanne and Robert Bendick—*Whitely House*, 62 p, illus, \$1.75 Presents the behind-the-scenes story of the medium of communication Factual material in simple drawings

A THOUSAND MARRIAGES—Robert Latou Dickinson and Lura Beam—*Williams and Wilkins*, 482 p, \$4.00 A reprint of a well-known book published in 1931 and for some time out of print, this study is sociological and psychological as well as medical Based on case histories of more than one thousand patients

Science News Letter, August 20, 1949

MINERALOGY

South Dakota Manganese Deposits Are Low-Grade

► UNTOUCHED deposits of metallic manganese in South Dakota could serve the nation in an emergency, but are low-grade in quality and can not be up-graded economically to meet industrial requirements, the U S. Bureau of Mines recently reported

The Bureau's conclusion is based on pilot-plant tests. The South Dakota deposits, estimated at more than 12,000,000 tons, are on both flanks of the Missouri river in an area included in the Missouri River Basin Development Plan The figure is a result of surveys made by Bureau technicians during 1945-47 in which 238 holes were drilled

America, today, produces very little of this metal essential in steel making, the production of dry electric cells, the manu-

facture of manganese sulfate for fertilizer and for other uses in the chemical field Over 1,500,000 tons are imported normally each year Domestic manganese ore, mined principally in Montana, amounts to about 135,000 tons Manganiferous iron ore, and similar ores, are also mined

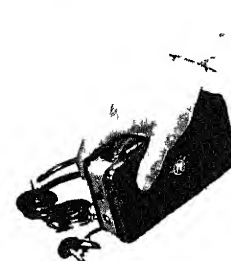
Russia produces approximately one-half the total amount of manganese ore mined in the world America was Russia's best customer for many years The supply used in the United States in postwar years comes largely from Cuba, Brazil, India, the African Gold Coast and the Union of South Africa, with smaller quantities from Mexico, Chile and from the Soviet Union Cuba's known reserves, due to wartime exploitation, are facing exhaustion America's best bet today appears to be the newly discovered deposits in Brazil north of the Amazon river

Present manganese mining in Brazil is in two well-known areas but both are far removed from United States ports One is near the Paraguay border, and the other near Rio de Janeiro The distance from New York to the area of the newly discovered deposits is only about half as great They are in the territory of Amapa, between the Amazon and the Guianas

Science News Letter, August 20, 1949

A fluorine compound with acetic acid is one of the most deadly poisons known, while fluorine with carbon, as in the freons used in refrigeration, is harmless

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❁ **SALT SHAKER**, with an electrical heating element in an air chamber in its base, gives promise of relief from the summer problem of delivering salt to the food at the dining table. This recently patented device is merely plugged into an ordinary electric outlet for a while when the salt gets sticky.

Science News Letter, August 20, 1949

❁ **HEADREST**, for persons who like to read while in the bathtub, is made of aluminum and has on its upper surface a covering of cushiony sponge rubber. An arm behind the curved piece of aluminum has a base by which the device can be attached to the tub in the best position for the reader.

Science News Letter, August 20, 1949

❁ **TRACTION DEVICE** for motor vehicles, recently patented, is attached to the outside of the wheel and has elongated grousers, or spikes, that project when wanted beyond the tire. These grousers are pivoted and can be turned along the tire when not needed for traction; they are adjustable in projection length.

Science News Letter, August 20, 1949



❁ **SPRAYING DEVICE**, shown in the picture, is for hayfever victims, to give quick relief by a local application of Pyribenzamine. Pressure on the flexible non-corrosive plastic tube produces a fine spray. The drug is available only on a physician's prescription.

Science News Letter, August 20, 1949

❁ **CARRYING HANDLE** for a bowling ball is made of a flexible material and holds the ball by means of a suction cup. An air passage within this recently patented device has a port or opening to the upper part of the handle which can be closed by the bowler when the cup is pressed into gripping engagement with the ball.

Science News Letter, August 20, 1949

❁ **ODOR ABSORBER** for the refrigerator utilizes activated carbon as a filter to remove gases and odorous vapors, and a small motor-operated blower to draw the air through the filter and recirculate it. Plugged into an electric outlet within the refrigerator, no service is needed except to reactivate the carbon occasionally.

Science News Letter, August 20, 1949

❁ **EDUCATIONAL TOY** for youngsters consists of a set of plastic cut-out designs which will adhere by finger-pressure to a glass, enamel or porcelain table top, or to a special board provided with the set. The cut-out designs, various-colored, are circular, triangular, rectangular and other shapes, and can be arranged to form a house, doll or other object.

Science News Letter, August 20, 1949

Do You Know?

The *trumpeter swan* is the heaviest flying bird in America.

A cord of good *hardwood*, well seasoned, can produce as much heat as a ton of coal or 200 gallons of fuel oil.

Calcite, a metamorphic limestone, mixed with cement, appears to give a concrete with unusual water- and acid-resistant properties, Norwegian scientists have discovered.

The *saddle-horse* population of the United States is estimated at about 850,000, more than half of which are work animals on western ranges.

Among the several types of *radio broadcast services* in the United States are the "Standard" or AM (amplitude modulation), the improved static-free FM (frequency modulation), TV or television, non-commercial educational, facsimile, and international.

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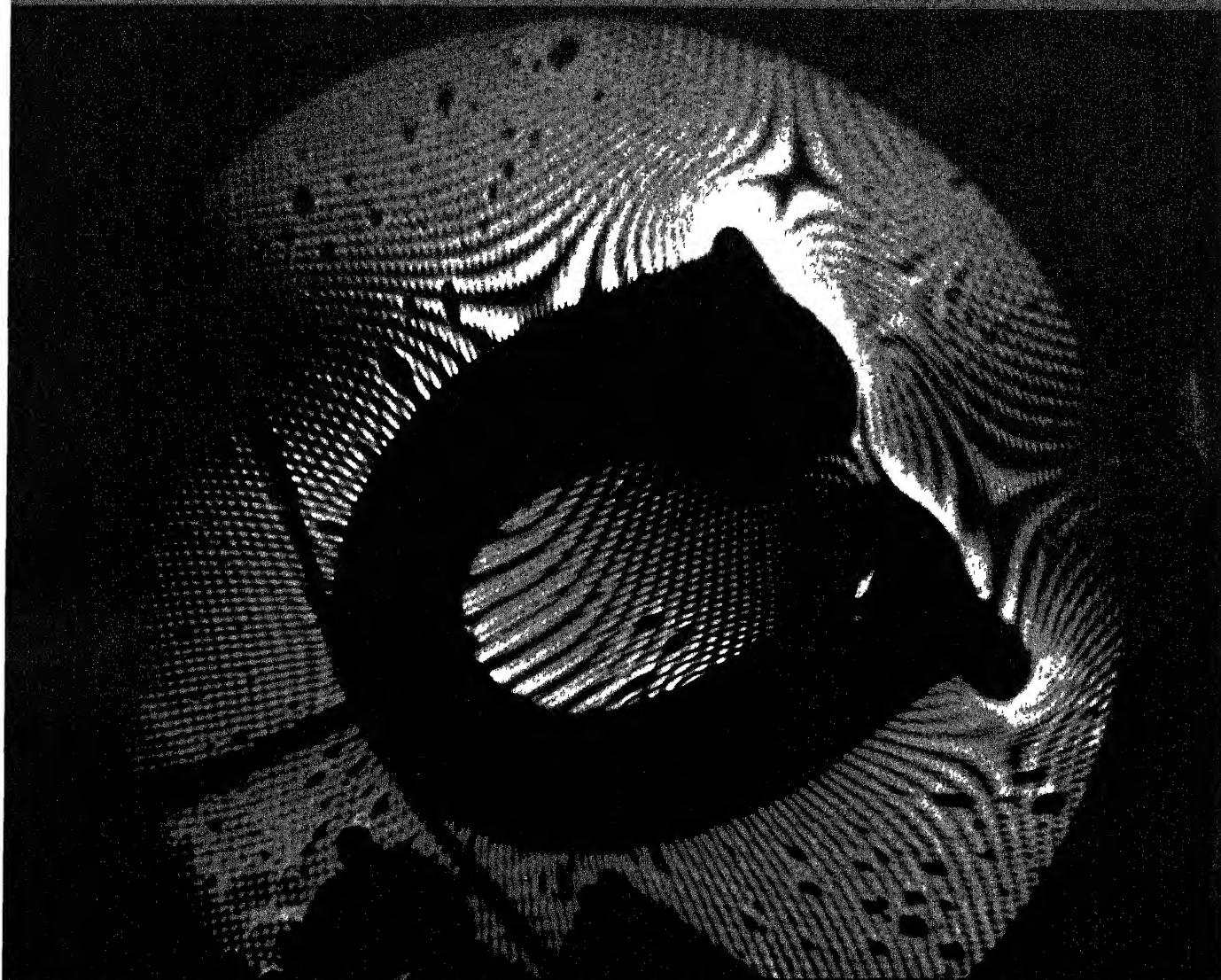
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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



Shadow Photography

See Page 141

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VOL. 26, NO. 9, PAGES 129-141



RCA scientists develop new *direct-reading* Loran instrument which simplifies problems of navigation.

The homing pigeon goes to sea

Now science gives the navigator an improved "homing pigeon instinct," a way which—without checking the sun or the stars—he can head his ship directly home.

Already thoroughly proved, *Loran equipment* has been simplified through RCA research and engineering, so that almost anyone can learn to use it in a few minutes. Free of human error, readings appear *directly* on the instrument. A quick check gives position.

Brain of this Loran system is a circuit

developed at RCA Laboratories which splits seconds into millions of parts—and accurately measures the difference in the time it takes a pair of radio signals to travel from shore to ship.

Given this information, the navigator, hundreds of miles from shore, can determine his position quickly and accurately. Loran's simplicity adapts it to every type of vessel from merchant ship to yacht. Manufactured by Radiomarine Corporation of America, a service of RCA, it is already being installed in U. S. Coast Guard rescue ships.

The meaning of RCA research

RCA's contribution to the development of this new direct-reading Loran is another example of the continued leadership in science and engineering which adds *value beyond price* to any product or service of RCA.

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MEDICINE

New Polio-Like Disease

Isolation of a virus has been made which produces symptoms in its victims which resemble mild polio. The disease was found in 1948 polio-diagnosed patients.

➤ POLIO symptoms may no longer point to polio infection but to a new virus disease which resembles it. Isolation of a virus which produces symptoms similar to the non-paralyzing form of polio was announced by Yale University.

Discovery of the virus which has up to now been masquerading as polio was made in patients living in cities hard-hit by polio last year, which was the second worst polio year on record.

Its existence was first suggested by Gilbert Dalldorf and Grace Sickles of the New York State Department of Health in Albany, N. Y. The new findings, which confirm the original discovery, were made by Drs. Joseph L. Melnick, Ernest W. Shaw, and Edward C. Cullen of the Yale School of Medicine and are reported in the PROCEEDINGS OF THE SOCIETY FOR EXPERIMENTAL BIOLOGY AND MEDICINE (July).

Little is known about the new disease caused by a virus which has as yet no name. But it has been found to break out

at the same time as polio in the summer season. The scientists believe that a fairly large number of patients were afflicted with the new disease last year and were falsely diagnosed as having polio.

Basis for this belief was the discovery of the virus in the sewage of last year's polio epidemic areas. Six cities—Hartford,

Norwalk, and New Haven, Conn., and Greensboro, High Point, and Winston-Salem, N. C.—yielded the virus on examination of their sewage. Moreover, flies tested for the new virus in Hartford, Conn., and High Point, N. C., as well as in the lower Rio Grande Valley of Texas, were found to be infected.

Animal experiments revealed that infant mice are susceptible to the new virus but older mice are not, nor is the monkey which is used for polio research. The chimpanzees, on the other hand, became infected but were not visibly sick.

There are many strains of the new virus which at present fall into two basic types unrelated to each other or to the polio virus, the Yale scientists declared.

Science News Letter, August 27, 1949

MEDICINE

Hormone May Rejuvenate

Cortisone, besides showing promise against arthritis, has been found to renew some body tissues broken down by the aging process.

➤ THE fountain of youth for aging people and a defense against more of the chronic diseases than arthritis may be found in

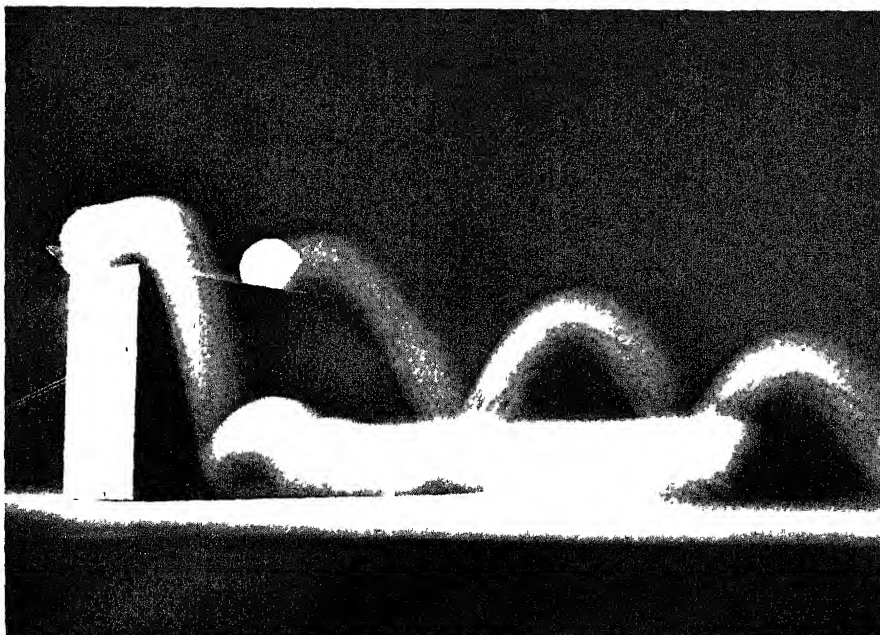
cortisone and similar hormones so dramatically effective in making the rheumatically crippled get up and walk.

That is the reason that there is an intensive search for new raw materials for synthesizing this adrenal cortical hormone. That is why the U. S. Public Health Service is asking \$1,750,000 in emergency money to speed the medical research and investigation.

There is official excitement over the fact that a vine, growing of which is illegal in Africa, has seeds that under certain conditions contains a substance, called 11-oxy-steroid, from which cortisone can be made. This is true despite the fact that it may take years to explore, prove and cultivate the strophanthus plants whose seeds seem to substitute so conveniently for the bile of slaughtered cattle that is now the starting point of cortisone synthesis.

Relief of 7,000,000 arthritics and over 100,000 rheumatic fever patients in the USA is the obvious but distant goal, but of deeper import is discovery that the substance that treats the patients so effectively actually seems to restore some of the tissues of the body that have been supposedly irreversibly changed by the inevitable process of aging. Cortisone seems to have a beneficial effect upon the metabolism of the collagens, the fibrous proteins that give support to the skin, tendons and bones.

In Mayo Clinic human experiments, much to the surprise of the investigators, old joints that were stiff were loosened up and the connective tissues were found to be physiologically renewed. This is the basis of renewed hope that a discovery



SUPER-COLD TEMPERATURE—Temperatures ranging to within a degree or so above absolute zero—459.7 degrees below zero on the Fahrenheit scale—have been made possible by a new “push-button” laboratory headed by Dr. Aaron Wexler of Westinghouse Research Laboratories. This will help scientists probe into how matter behaves at super-cold conditions. Here the tennis ball at left has been dipped in liquid nitrogen, 340 degrees below zero Fahrenheit. The ball at right is in its natural state. The super-cold ball rolls without bouncing when pushed off a pedestal while the other ball bounds.

even beyond the successful treatment of the rheumatic diseases has been made

Cortisone is also being tried, experimentally, in certain kinds of cancer

The supply of this hormone, produced by Merck and Co in what is called the most complex and difficult chemical synthesis of commercial or medical value, is still extremely small. Only a score or two of patients, who have to be given the drug every day, have been treated. The drug is of course priceless, but it costs at least \$20 a day to sustain a patient with 100 milligrams of cortisone which is valued at \$200 to \$400 a gram. Next year production from ox bile (it takes 40 cattle to produce enough for one day's treatment) will supply about 2,000 to 2,500 patients.

If some substitute for the bile from the slaughter houses could be found, the quantity might be larger.

In 1915 Drs. Walter A. Jacobs and Michael Heidelberger of the Rockefeller Institute in New York isolated from the seeds of *strophanthus* a chemical substance they called sarmentogenin. Cortisone's chemical ancestor, 20 steps closer to the final product than the bile acid starting point, was found to have the essential chemical structure duplicated in the African seed chemical. Here then was a chance to produce the final hormone from a plant that could be cultivated like other crops with a supply independent of the demand for meat and the amount of cattle slaughtered.

A *strophanthus* search is in progress. A Swiss group under Prof. Tadeus Reichstein of Basle was in the field first, because they were looking for a plant source for sex hormones that mean so much to the happiness of the human race. They found the desired plants and seeds in Africa. But there are complications for there are about 30 species of *strophanthus* and only one, *Strophanthus sarmentosus*, appears to produce the desired 11-oxy-steroid chemical grouping and then only under certain

growing conditions and at certain times of seed growth.

A two-man expedition, Dr. John T. Baldwin of the U. S. Department of Agriculture and Dr. Erich Mosetig, of the U. S. Public Health Service, are in Basle beginning to track down *strophanthus*. First checking up the Swiss work, which has actually produced a small amount of cortisone from *strophanthus*, Dr. Baldwin will then collect plants, seeds and cuttings in the African area between Liberia and the Cameroons where the vine is supposed to grow best.

Natives are prohibited from raising the vine because they have used it in making an arrow poison and in making a brew with which charged criminals were tried—usually to die of the powerful heart-stimulating glucocides in the potion they were forced to drink (not the same chemicals used as the cortisone raw material).

So Dr. Baldwin will be searching mountain tops and isolated trees for the illicit vines to be brought back to this country for the sake of medicine. Probably cultivation of the plant will be legalized under controlled conditions, just as poppies are raised for opium.

Some years ago Dr. David Fairchild, veteran plant explorer, sent back from Africa some *strophanthus* plants and they were grown in Florida, Cuba, Puerto Rico, and the Canal Zone. All of them flowered beautifully but strangely only the one near Coconut Grove, Fla., bore seeds. These plants are being studied anew but they may not be the right species.

All plant and animal sources for steroid chemicals out of which cortisone could be made are being sought. Chemists believe they can make the hormone out of mothballs and vinegar (naphthalene and acetic acid) but it would be a long and expensive process. They would rather start with something upon which nature has already done most of the synthesizing.

Science News Letter, August 27, 1949

Words in Science— SYMPTOM-SYNDROME

➤ A SYMPTOM, you say it simp-tum, is a sign of disease or of some physical or mental condition. It is what the doctor looks for in order to diagnose what is wrong with his patient.

A syndrome, pronounced sin-drome, is a set or pattern of symptoms that occur together—the total of all the signs that are evident in the presence of any disease or condition.

Science News Letter, August 27, 1949

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GENERAL SCIENCE

Loyalty Order Harmful

Brilliant scientific minds will be denied to the furtherance of research in atomic energy under present security clearance procedures, AAAS warns.

➤ A WARNING that atomic energy development "will be shunned by men of ability and pride" if present trends in security clearance of scientists continue was sounded by a special committee of the nation's largest general science organization, the American Association for the Advancement of Science.

Conclusions of the AAAS's special committee on civil liberties for scientists, which include an attack on the loyalty order for federal employees, were published in the Association's journal, *SCIENCE* (Aug 19). The full, 77-page report of the six-man committee is still undergoing revision prior to publication, it was announced.

Three main conclusions of the report are

1 "Secrecy is damaging to both science and democracy"

2 "If nothing is done to reverse the present trend to require security clearance of scientists who do not have or desire to have access to restricted data, it is likely that many of the most penetrating and original scientific minds will be turned to pursuits unrelated to further development of the atomic energy program"

"Work in that field will be shunned by men of ability and pride if they are constantly treated as objects of suspicion and possible calumny"

3 "Until the loyalty order deals with the way employees act rather than with the way they supposedly think, we shall inhibit the freedom and encourage the insecurity of our public servants"

The committee was formed in Dec 1947, with Dr Maurice B Visscher, University of Minnesota physiologist, as chairman. At present, Dr Visscher and Dr E C Stakman, University of Minnesota plant pathologist and president of the Association, are working on revision of the full report, the journal stated.

Members of the committee are Dr Philip Bard, physiologist of the Johns Hopkins University, Dr Robert E Cushman, Cornell University political scientist, Dr Richard L Meier, an American scientist now working in an English research laboratory, and James R Newman, a Washington lawyer and author who is a contributing editor of *New Republic* magazine. Walter Gellhorn of the Columbia University Law School served as consultant to the committee.

Military clearance procedures for civilian scientists are attacked by the report on grounds that military men determine

whether or not clearance is granted, and the only appeal for the civilian scientist not cleared is to another military body, the Industrial Employment Review Board.

"Such subjection of the destinies of civilians to military tribunals is contrary to national tradition," the report asserts.

The U S Atomic Energy Commission is accused by the committee of "excessive precautions" which, it finds, "discourage participation in important research activities closely linked to the nation's well-being"

There is, the report suggests, a tendency to require security clearance of scientists who will not be dealing with classified, or restricted data, except through personal contact with other scientists. Only one-tenth of the scientists at the Brookhaven National Laboratory of the AEC on Long Island work with secret material, the committee estimates, but all scientists at the laboratory must be cleared before they can work there.

"This apparently reflects a yielding to uninformed or sensationalist legislators and others who tend to exaggerate the

problem of 'keeping our atomic secrets,'" the report contends.

The report says that the problem of "faithless scientific personnel in this country appears to be markedly less grave than the public has been led to suppose." And, it is added, it's harder to give away a scientific secret than most people realize.

Fewer scientists need to be given security clearance, the committee urges.

The President's loyalty order needs "a drastic revision," the AAAS group charges.

Arguing that present laws already protect the government from employees who advocate its overthrow, the report contends that the order is "superfluous."

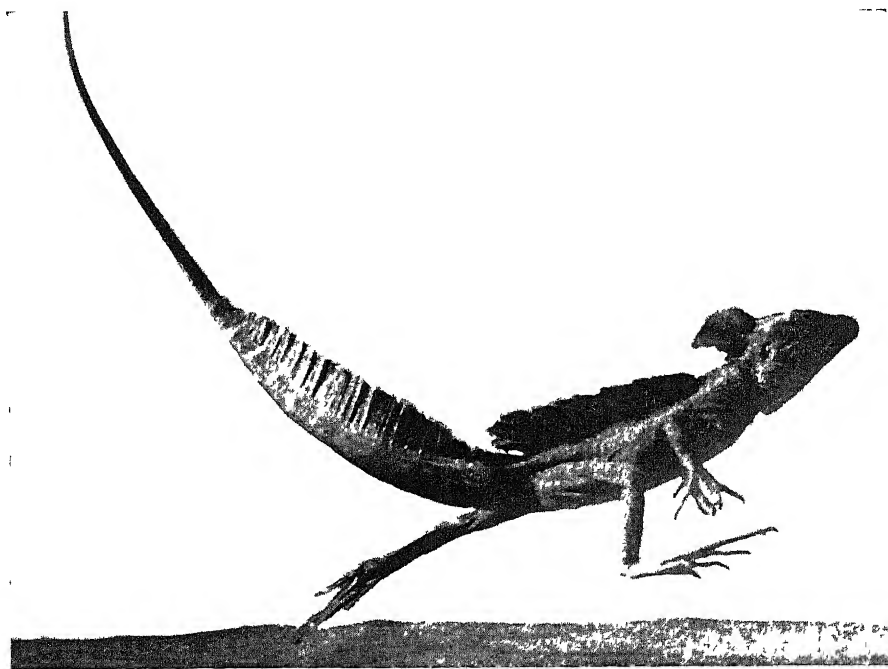
"The cost (of continuing the loyalty order) will in the end be borne not by the employees who are deprived of their normal freedom to believe and behave as they wish within the limits law has set. It will be borne by the nation as a whole," the committee concludes.

Science News Letter, August 27, 1949

ZOOLOGY

Tail of a Running Lizard Serves as a Balance

➤ BASILISKS, which are large lizards from the American tropics, rise up and run on their two hind legs when they are in a real hurry. There is a temptation to describe the basilisk as the lizard that runs like a man, but this would not be quite accurate. There are some rather wide differences in the two modes of bipedal movement, Dr Richard C Snyder, now of the



HIGH-TAILING LIZARD—Running basilisk lizard springs clear of the ground as it hits the top of its stride, upflung tail balancing forward-thrust body.

University of Washington, discovered when he analyzed highspeed motion pictures taken for him by Dr. A. A. Allen of Cornell University.

A running man swings his legs straight back and forth, but the running basilisk flings his legs out sidewise in a wide arc, more like some of the fancy steps seen in a ballet or in figure-skating, Dr. Allen found. This relatively less efficient type of motion, apparently dictated by the lizard's anatomical structure, makes its high speed all the more remarkable—for the basilisk moves like the proverbial blue streak when it feels the urge for speed.

When it is walking at leisure the basilisk goes on all fours, using its shorter and comparatively feeble forelegs. Sometimes it squats, kangaroo-fashion, on its hindlegs and long tail. But on a split second's notice it can break from a dead standing start into its lightning-like two-legged run.

When it reaches top speed, it is clear of the ground for a short part of each stride, thrusting itself into the air with the final push of its toes and catching its weight on the partly flexed opposite hindleg as it comes down.

The basilisk's long, heavy tail is an important organ in its running, Dr. Snyder discovered. Normally, as it picks up speed, it lifts its tail high, balancing its forward-thrust body.

The balancing function of the tail was strikingly demonstrated when a third of its length was surgically removed from one of the animals. The luckless lizard tried to break into its normal two-legged run, but after only one or two strides had to flop forward. When two-thirds of the tail was removed the performance was even poorer. A full-length tail therefore seems indispensable to the running basilisk.

Science News Letter, August 27, 1949

ENGINEERING

New "Electronic Brain"

► FINAL wraps were removed by the Eckert-Mauchly Corporation from what is said to be the world's second all-electronic automatic computing machine. The new device is smaller in size in comparison with its 30-ton parent, but faster in operation. Its speed and accuracy, 12,000 times faster than a human being, was demonstrated in Philadelphia to a group of scientists and representatives of the press.

The new calculator stands five feet high, four feet long and one foot wide. With its accessories, however, it requires a much larger space. It has been named BINAC, because it uses a binary system. The only other all-electronic computer is the ENIAC, short for Electronic Numerical Integrator and Computer. BINAC was built by the same men who designed and constructed its predecessor for the U. S. Army in 1946. This first BINAC was built for Northrop Aircraft, Inc., Hawthorne, Calif., which will be the first private concern to acquire an "electronic brain." A crew from the California company is now in Philadelphia to learn how to operate the device and keep it in working condition.

Actually twin computers, BINAC has duplicate arithmetic channels so it can check itself at every step. It has also two mercury tube "memories." These hold electric pulses until needed. Each twin of the BINAC has only 700 vacuum tubes, while the ENIAC has 18,000.

At the demonstration there, numbers were selected at random. These were typed on a small keyboard having only eight keys. The BINAC used coded instructions from a magnetic tape to deal with these numbers. Square and cube roots are calculated by it in a fraction of a second.

A human being with pad and pencil can find a square root correct for eight or nine

digits in six minutes. With a desk calculator he can do it in two minutes. The BINAC does it in one-sixtieth of a second.

The demonstration at the Eckert-Mauchly Computer Corporation factory was given by Dr. John W. Mauchly and J. Presper Eckert, Jr., the inventors. As explained by them, BINAC operates in the binary system instead of the decimal one, and distinguishes between zero and one. It has to convert automatically to the binary before beginning any calculations and reconverts back again to get its answers printed out on an electric typewriter. Actually, the computer receives and puts out figures in the octal system, from zero to seven, as this converts more easily to binary than the decimal system does.

The main reason for the smaller size of BINAC is the mercury memory tube invented by Mr. Eckert. It replaces about 17,000 vacuum tubes used in ENIAC, and can store 15,000 binary digits. Electrical pulses, representing numbers and instructions, are sent through the mercury tube at a rate of 4,000,000 per second. They are held in the column by being rerouted through it as long as necessary. It is the tremendous speed of the mercury memory that makes it possible for BINAC to handle a great volume of data.

A larger, more general-purpose type of computer named UNIVAC is also being readied by the Eckert-Mauchly company. One is to be used by the National Bureau of Standards in Washington, and another by the Prudential Insurance Company of America.

There are earlier giant computer machines than the ENIAC and BINAC that are able to solve complicated mathematical problems, but they are not all-electronic. Harvard's Mark I and II, the huge device

of International Business Machines Corp., and the Bell Telephone Laboratories relay computer, might be mentioned. There are now other all-electronic computers under development, particularly at Harvard, Massachusetts Institute of Technology, Princeton and the University of Pennsylvania. First place, however, is claimed for ENIAC and BINAC.

Science News Letter, August 27, 1949

ENGINEERING

"Daily Diary in Dust"

Written by New Device

► A SIMPLE device developed at the atomic energy project on the Los Angeles campus of the University of California writes a "daily diary in dust."

The instrument is used to determine air-borne contaminants and to what extent air in a given area is contaminated. Based on a continuous jet impaction method, it utilizes a jet tapering to a fine slit, through which air samples are drawn. Particles in the air sample are deposited on a revolving glass disk. The disk can be calibrated to collect samples continuously over any desired period of minutes, hours or even up to a week.

The device is so sensitive that it will collect ash deposits from burning buildings within a five-mile radius, detect evidence of personnel in the area from the slight amount of dust stirred up, note meteorological changes and record many other events which agitate particles in the air.

All these occurrences are so precisely recorded that the time they happened can be accurately determined from the deposits on the disk.

Dr. Benedict Cassen, Dr. F. A. Bryan, Leonard Baumash and Lawrence Curtis of the UCLA medical school atomic energy project developed the new device.

Science News Letter, August 27, 1949

GENERAL SCIENCE

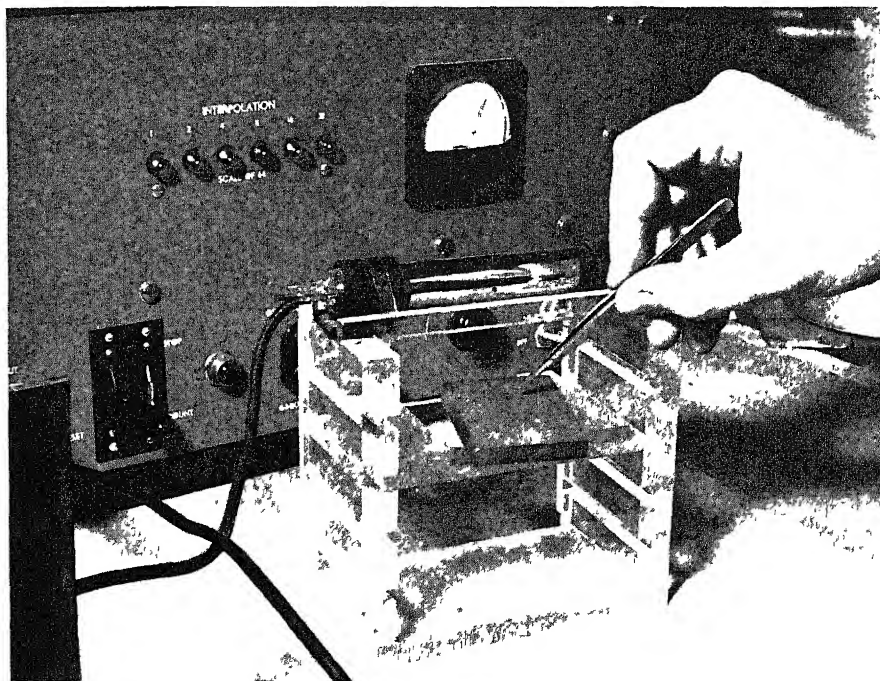
UNESCO To Promote World Exchange of Publications

► INTERNATIONAL exchange of publications will be aided by the publication in Paris this year of a manual on the subject, prepared by the United Nations Educational, Scientific and Cultural Organization.

Included will be a list of institutions throughout the world which are willing to exchange publications, and UNESCO officials are appealing to all institutions for information which can be used in the list. The institutions will include libraries, universities, scientific institutions and learned societies.

Information on institutions and publications available for international exchange is desired by the UNESCO Clearing House for Publications in Paris.

Science News Letter, August 27, 1949



RUST-CONTROL STUDY—Progress and destructive effect of the radioactively-coated rust patch being pointed to by the tweezers will be revealed on a photographic plate to be placed over the metal. The Geiger counter, glass tube above the metal square, picks up the radiations.

DENTISTRY

New Tooth Decay Theory

Those cavities in your teeth may be due to bacterial enzymes which release sulfuric acid from the protein in teeth, English scientist suggests.

A NEW theory that sulfuric acid in your teeth causes cavities when it is set free by chemicals unleashed by germs has been proposed by an English scientist.

Dr. P. Pincus, of the physiology department, Medical School, Middlesex Hospital, writing in the *BRITISH MEDICAL JOURNAL* (Aug 13), explains that in enamel and dentine, the bone-like tissue below the enamel, is a protein containing sulfuric acid. Germs known as Gram-negative bacilli are present in the mouth, and secrete an enzyme called sulfatase. Chemical reaction between tooth protein and the enzyme sulfatase releases the pure sulfuric acid which then attacks teeth and causes decay, the theory holds.

In support of his new theory, Dr. Pincus points out that there are tiny grooves or cracks at the tips of teeth. When teeth first erupt they are covered by a fine layer of protein. This is worn off on the crowns by eating but since the cracks are narrow it remains in them. This site is thus a very favorable place for the chemical reactions to take place. Previous experiments have

proved that the grooves are the most common place for decay to start.

A crack in the enamel-armor of the teeth which is not completely closed would be a minute avenue of entrance for bacteria to the dentine. Here the same chain of events could occur by the formation of bacterial enzymes reacting with the store of protein inside the tooth to burrow from beneath and cause decay.

Dr. Pincus refutes the idea that lactic acid formed by bacterial action is responsible for this decay at the bottom of the groove. Even if food particles are deposited in these grooves and thus form the site for lactic acid formation, the decay would occur on the sides of the groove rather than at the bottom because this has a plug of protein protecting it.

He concludes that tooth decay is not due to any bacillus but to certain bacterial enzymes which can release the sulfuric acid from the protein in teeth. Further study is needed to find out how the bacilli produce these enzymes and make them active.

Science News Letter, August 27, 1949

ENGINEERING

Rust Problems Studied With Radioactive Isotopes

➤ THE iron rust problem is being tackled by General Electric scientists with the help of radioactive isotopes from the Oak Ridge, Tenn., laboratories. The rusting action is photographed by X-rays from a radioactive surface.

In the study, a solution containing radioactive iron is electroplated onto the surface of the metal to be examined. Then a photographic plate is placed against this surface and left for several days. During this time, an X-ray exposure is made on the plate by the radioactive coating. As the test metal rusts, a decrease in radiation results, showing up graphically on the photographic plate as lighter areas.

By taking a series of these pictures, called autoradiographs, the scientist can see photographically the nature of the rust forming on the test metal. It is expected the photos will help show how rust starts, where it starts, and how deep it goes.

Science News Letter, August 27, 1949

CHEMISTRY

England Wants To Improve Detergents from Petroleum

➤ WITH the use of cleansing synthetic detergents from petroleum firmly established in the British textile and other industries, intensive studies are to be continued in that country with the objective of developing better products and methods. The results will help relieve the world shortage of vegetable and animal fats for soap.

British work in making these detergents was explained to the United Nations Scientific Congress on the Conservation and Utilization of Resources, held this month at Lake Success, N. Y., by F. Mackley, Shell Refining and Marketing Co., Ltd., Cheshire, England. He reviewed the petroleum refining industry in the United Kingdom, showing the predominance of specialized refining for lubricating oils and bitumens as well as detergents.

There is little crude oil mined in England, although the so-called Easington field has reached a production of some 70,000 tons a year. This crude yields high quality lubricating oil and wax distillates.

Crude oil, however, is imported in quantities of several million tons annually and refined in domestic plants. The industry is currently dominated by the very considerable expansion of general refining facilities which is now taking place, according to Mr. Mackley. Certain refineries are to devote their activities to petroleum chemicals, including aliphatic alcohols and ketones, acetone, glycols, aromatic hydrocarbons, solvents and plastics.

Science News Letter, August 27, 1949

WILDLIFE

Ibex Being Re-Established In Germany, Austria

➤ THE IBEX, heavy-horned wild goat of the Alps, is being re-established in the mountains of Germany and Austria, where it was exterminated by overhunting many years ago, states Dr Lutz Adolf Heck, Munich zoologist, in the German scientific journal, *ORION* (July). A good beginning has already been made in Switzerland.

The start for the new ibex population of the Bavarian Alps was made by penning a small colony of the animals in a special high-walled enclosure near Berchtesgaden, Hitler's old playground. Some of them came from the great zoological garden of Hellabrunn, near Munich. Zoologists in charge kept up the program even during the war.

By 1944, the colony had grown to 27 head, including a number of kids that had been born in the enclosure. Half of the animals were liberated then, and the remainder shortly after the end of the war. Some of the ibex have been seen from time to time, and prospects for the re-establishment of this element in the natural fauna of the Alps seem hopeful.

Medico-magical superstitions were partly responsible for the extermination of the ibex population of the Swiss, Austrian and German mountains in early modern times. Wild ideas prevailed regarding the powers of bezoar stones, which are hardened hairballs sometimes found in the animals' stomachs, and of a cross-shaped bony concretion from the heart region. Such extravagant prices were paid for these objects that protective legislation was disregarded by the black-market hunters.

Science News Letter, August 27, 1949

CHEMISTRY

Oil Wells Yield Nearly Half of Our Iodine Supply

➤ NEARLY half the 1,500,000 pounds of iodine used annually in America now comes from oil wells, *INDUSTRIAL AND ENGINEERING CHEMISTRY*, a publication of the American Chemical Society, says. The iodine is obtained from a brine that comes up with the oil.

Obtaining iodine from oil-well brine is not new. Its first recovery from this source was in 1926 in Louisiana. Oil wells on the West Coast, however, are now supplying the widely used chemical in large amounts, decreasing greatly the amount that must be imported.

The chief use of iodine is as a germicide. It is a familiar medical for cuts and bruises in many households. It is also used as a vital element in cattle feed, in photographic films and in dyes. It is used in methyl iodide, one of the newer gases employed in fire extinguishers, and in a number of other important iodine compounds.

Much of the iodine used in the United

States comes from Chile, where it is found as an impurity in saltpeter. Some comes from Japan where it is obtained from the ashes of seaweed. There is considerable iodine in ordinary seawater, but not enough to make its recovery economical.

In the process of recovering iodine from oil-well brine, the chemical is literally blown out of the oil brines in huge towers built with acid-proof bricks, this article states. It is then captured from the air and solidified. The report, prepared by Frederick G. Sawyer, of the Industrial and Engineering Chemistry staff, in collaboration with M. F. Ohman and Fred E. Lusk of the Dow Chemical Company, asserts that sufficient quantities of oil-field brine are available in this country so that in an emergency the entire iodine requirement could be obtained from domestic sources.

Science News Letter, August 27, 1949

PHOTOGRAPHY

Early Camera Will Be Displayed at Museum

➤ ONE of the earliest cameras in the U. S. will be displayed at the photographic museum at George Eastman House, Rochester, N. Y., when the house is opened to the public in a few months.

The camera is one of the first Daguerre cameras sold in this country. It was sold to Dr. Samuel A. Bemis, a Boston dentist, by Francois Gouraud, April 15, 1840. Gouraud was agent in the U. S. for the famed Louis Jacques Mande Daguerre, inventor of the daguerreotype. Dr. Bemis paid \$51 for the camera.

In addition to the camera, the museum will also exhibit the bill of sale and Dr. Bemis' first picture, a view of King's Chapel Burying Ground in Boston.

"Even to our eyes," declares Beaumont Newhall, curator of Eastman House, "it is a good photograph."

Science News Letter, August 27, 1949

AGRICULTURE

Fluorescence May Help Solve Soil Problems

➤ FLUORESCENCE, the visible light given out by some substances when irradiated with invisible ultraviolet light, may become a useful tool in the scientific study of soils. This suggestion is offered by Prof. P. H. Gallagher of University College here, in a letter to the editor of the London science journal, *NATURE* (Aug. 13).

Prof. Gallagher has done some preliminary work along this line. He reports that humus in its most advanced stage has a yellow fluorescence, and that a waxy substance sometimes found in mucky soils fluoresces bluish-white. Living things found in the soil, such as earthworms and young roots, have their own specific modes of fluorescence.

Science News Letter, August 27, 1949



BIOCHEMISTRY

New Vitamin Factor In Yeast Discovered

➤ A NEW vitamin factor has been isolated from yeast by cooperative efforts of scientists in research laboratories of Sharp and Dohme, Philadelphia, and Merck and Co., Rahway, N. J. The vitamin, called biocytin, was announced by Dr. Lemuel D. Wright of Sharp and Dohme at the First International Congress of Biochemistry in Cambridge, England.

No medical use for the new vitamin factor is known yet, Dr. Wright pointed out, but clinical studies to determine its role in human metabolism are now under way.

Biocytin occurs in nature only in infinitesimal amounts. Yeast extract, with a concentration of about one part of biocytin per million of dry matter, was selected for the isolation work.

Thus far, more than eight tons of yeast extract have been processed since isolation work began and less than a thirtieth of an ounce of the pure material has been produced.

Participating in the studies besides Dr. Wright were E. L. Cressen and H. R. Skeggs, of Sharp & Dohme, and Drs. Karl Folkers, T. R. Wood, R. L. Peck and D. E. Wolf, of Merck.

Science News Letter, August 27, 1949

BOTANY

"Bachelor" Honey-Locust Desirable as Street Tree

➤ A "BACHELOR" honey-locust tree, which bears male flowers but no female ones and hence produces no seed-pods, has been bred by John D. Siebenthaler of Dayton, Ohio. Absence of seed-pods is considered desirable when this tree is planted as a street tree, since the heavy crops of pods borne by ordinary honey-locusts mess up pavements and parkings and require a great deal of raking and sweeping to clear away. The tree has the further advantage of being wholly without the long, branching, needle-pointed thorns that make most honey-locusts a fair plant-kingdom equivalent of porcupines.

Mr. Siebenthaler describes the growth-habit of his tree as "vase-shaped." This is the shape that has long made the American elm a favorite for street planting. The tree can be propagated by grafting or by hormone-treated cuttings.

U. S. plant patent 836 has been issued on this thornless, podless honey-locust.

Science News Letter, August 27, 1949

THE FIELDS

GENETICS

Study of Freak Births in Mice May Help Humans

➤ STUDY of freak births of genetic origin in laboratory mice will, it is hoped, eventually help to prevent or at least remedy similar occurrences in human babies, Prof L C Dunn of Columbia University stated at the celebration of the twentieth anniversary of the Jackson Laboratory in Bar Harbor, Me

Most such abnormal developments result from mutations, or sudden evolutionary shifts, Prof Dunn told his audience. They include such things as forked tails, no tail at all, harelip, cleft palate, and "dead end" digestive systems. One such mutation, loss of the tail, may explain what is now the normal condition in man and the higher apes, the speaker pointed out, but some of the others are far from being matters of self-congratulation. Babies with closed digestive tracts invariably die soon after birth, so that study of the heredity of this fatal trait in human beings is not possible. However, since mice reproduce much faster and in larger numbers, it is possible to make parallel genetic studies on mouse families showing the same trait, with some hope of eventually obtaining data useful in human applications.

Sometimes non-hereditary changes arise which exactly resemble those due to hereditary causes, Prof Dunn continued. Such non-hereditary changes are known as phenocopies. Study of phenocopies, and of the environmental factors that may have helped to produce them, often throws light on their hereditary "opposite numbers."

Science News Letter, August 27, 1949

PLANT PATHOLOGY

New Disease Is Killing British Sycamore Maples

➤ A NEW fungus disease is killing sycamore maples in England, and plant pathologists are on the lookout for its possible appearance in this country. The sycamore maple is native to the Old World, but is used in Washington, D C, to a considerable extent as a shade tree.

The fungus works its way in between bark and wood. Eventually the bark peels off, leaving a dark, velvety surface exposed. The velvety appearance is due to billions of deep-brown spores, which float through the air to spread the disease farther. When the fungus has worked its way all around the trunk, girdling the tree, death ensues.

The disease has been under observation

in England since 1945, but is given its first description in the London scientific journal, NATURE (Aug 13). The report is presented by P H Gregory of the Rothamsted Experimental Station, T R Peace of the Forest Research Station at Wrecclesham, Surrey, and S Waller of London.

The causal fungus has not yet been identified, and it may be a hitherto unknown species. The report states that the disease has some resemblance to one disease of American hard maples and another of the London plane or sycamore cultivated in the United States. The causal fungi of both these diseases have been identified.

Science News Letter, August 27, 1949

MEDICINE

Involuntary Sterility of One Year Needs Treatment

➤ ONE YEAR is long enough to wait before seeking treatment for sterility if a couple has discontinued birth control and still does not have a baby, a team of Baltimore doctors conclude from a study of 2,000 expectant mothers.

This applies to families using birth-preventing methods who wish to space the birth of their children over a two- or three-year period. The common practice at present is to wait two or three years before the physician will attempt remedial measures.

The report by Drs Alan F Guttmacher and Dr Samuel Rubin of Johns Hopkins University School of Medicine and of the Sinai Hospital, Baltimore, and Dr Christopher Tietze of the National Committee on Maternal Health, Inc, appears in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Aug 20).

Their suggestion is based on the results of the study which showed that three-fifths of the patients became pregnant within three months of their decision to have a baby. And 90.8% were pregnant within the first year after birth control was discontinued.

Not all of these were wanted babies. The physicians pointed out that 374 or 18.7% of the pregnancies were due to failure of the birth control methods. Thus, they warn, may not be a true picture of the situation since it is impossible to determine how many of these women will have abortion or will not come to the physician.

Moreover, the figures are somewhat distorted by the fact that there are many couples who practice birth control successfully throughout their married life and it is impossible to make a statistical study including them.

In this group 1,653 women became pregnant who had previously used contraceptives. In over 85%, the condom and diaphragm were the methods practiced for birth control. The physicians concluded that these two methods were the most effective of any of those used.

Science News Letter, August 27, 1949

MEDICINE

Twins May Prove Ulcer Predisposition Inherited

➤ THE possibility that a predisposition to peptic ulcers is inherited is to get further scientific investigation in the study of twins.

Dr A C Ivy of the University of Illinois, in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Aug 20), appealed to doctors to send him reports of twins in which one or both had peptic ulcers.

He pointed out that twins have in the past helped to establish the fact that predisposition to tuberculosis, diabetes, tumors and intelligence are inherited.

So far, there are only six cases of peptic ulcer in twins on record. He is certain there are many that are not reported since twins are born in one of 86 births and identical twins in one of 344 births.

Dr Ivy hopes to receive further evidence from practicing physicians, which might help to support this theory.

Science News Letter, August 27, 1949

CHEMISTRY

Turning Negroes White by Chemical Is Impractical

➤ THE scientist who first investigated over a decade ago the strange phenomenon of Negroes turning white, is authority for the fact that the chemical treatment, given publicity in a national magazine, is impractical and dangerous.

He is Dr Louis Schwartz, a retired skin specialist of the U S Public Health Service living in Washington.

He recalled that Negroes in a tannery at Waukegan, Ill, found that their arms and hands were turning white. The cause was traced to a hydrocarbon in the rubber gloves they wore.

This effect has been the subject of hope exploited many times that the color line might be broken, but applications on the skin are slow and patchy and not satisfactory. No one has dared take the chemical internally, as it would have to be administered to produce a uniform effect, because the chemical is poisonous.

The chemical, the monobenzyl ether of hydroquinone, is a bleach that is used as a preventive of oxidizing of rubber (trade name Age-Rite-Alba). It bleaches not Negro skin alone, but any dark pigment. It has been used medically to bleach liver spots on white people.

Dr Schwartz recalls that when it was proposed to feed the chemical to Negroes experimentally he could not secure any suitable volunteers.

It takes a month or two to produce the local bleaching of skin and the effect produced is a deathly white, which may nevertheless be spotty.

Science News Letter, August 27, 1949

ASTRONOMY

Equinox Brings Fall Stars

Jupiter and Venus will be the only planets visible in the September evening sky. Vega will be the brightest star to be seen in the evening.

By JAMES STOKLEY

► THE MONTH of September brings, on the 23rd, the autumnal equinox. This comes at 4:06 a. m., EST, the moment that the sun is directly over the earth's equator. For us in the northern hemisphere this is the beginning of autumn, though people in southern countries know it as the beginning of spring. In the evening sky the ever-changing constellations show us that this event is at hand, as groups that were conspicuous during the summer disappear, while others which will become more prominent during the fall and early winter have now become visible.

Jupiter and Venus continue in September to be the only planets visible in the evening sky—and only Jupiter is to be seen throughout the evening. It shines brightly in the constellation of Sagittarius, the archer, low in the south for the times to which the accompanying maps have been prepared. These show the aspect of the heavens at about 10:00 p. m., your standard time, and an hour earlier at the middle of September. (Add an hour if you are on daylight time.) Jupiter has a magnitude on the astronomer's scale of minus 2.1, which makes it more brilliant than any nearby star, so it is easy to locate.

Venus Near Horizon

Venus is even brighter, of magnitude minus 3.5, but you have to look to the southwest, near the horizon, just after the sun has gone down, in order to see it. Since last April 16, when it passed the sun, it has been moving eastward through the sky. But at the same time it has been getting farther and farther south, and that is why, even though it has been drawing away from the sun, it still has not gotten higher in the evening sky. In countries of the southern hemisphere, however, it has now reached great prominence, as it will do for us by the end of the year.

Venus and Jupiter are both planets—bodies like the earth that revolve about the sun and shine by the sunlight they reflect to us. Of different nature are the stars, which are distant suns, shining by their own luminosity. Vega, high overhead these evenings in the constellation of Lyra, the lyre, is the brightest now visible. Also overhead is Cygnus, the swan, with brilliant Deneb, and nearby, toward the south, we can see another star of the first magnitude, which is Altair, in Aquila, the eagle. In the same region, just below Lyra in the west, is the large constellation of Hercules.

Though it does not contain any stars of the first magnitude, it is easily recognized. Six of the principal stars in the group outline the shape of a butterfly.

The other first magnitude stars shown on the maps all happen to be near the horizon. Low in the northwest is Arcturus, in Bootes, the bear driver, which is just to the left of the familiar "great dipper," part of Ursa Major, the great bear. Farther to the right, low in the northeast, one may see Capella, in Auriga, the charioteer. During the coming months, this group will rise higher into a more prominent position, while Bootes is soon to disappear from the evening skies.

Fomalhaut in South

Making its brief autumn visit to the evening heavens, Fomalhaut, in Piscis Austrinus, the southern fish, can be observed low in the south. It is just below the constellation of Aquarius, the water-carrier, with which it is associated in fable. The old star maps, which showed the imaginary figures that the star groups were supposed to depict, represented Aquarius as an old man, holding a jar from which water was flowing, into the mouth of the southern fish! This is a rather watery part of the sky, because to the left of Piscis Austrinus is Cetus, the whale, and above him are two more fishes, in the constellation of Pisces. This group, by the way, extends below and to one side of the "great square," an easily recognized part of the constellation of Pegasus, the winged horse.

Only one other planet, in addition to Jupiter and Venus, can be seen during the night in September. Mars, now in Cancer, the crab, rises in the east several hours

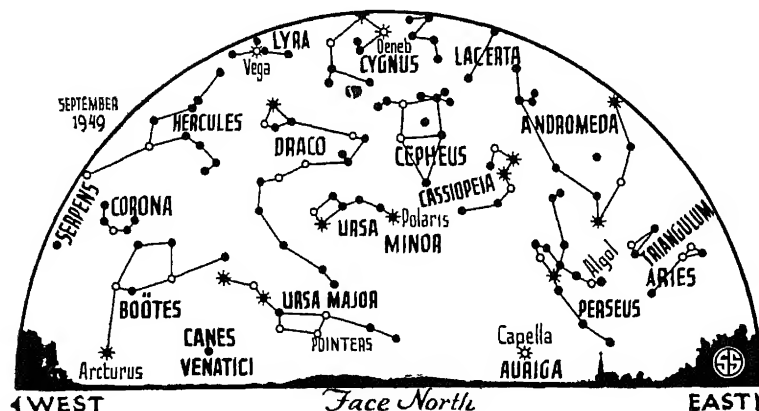
before sunrise. It is approaching but is still quite distant, and appears of the second magnitude, though its red color will help one to find it.

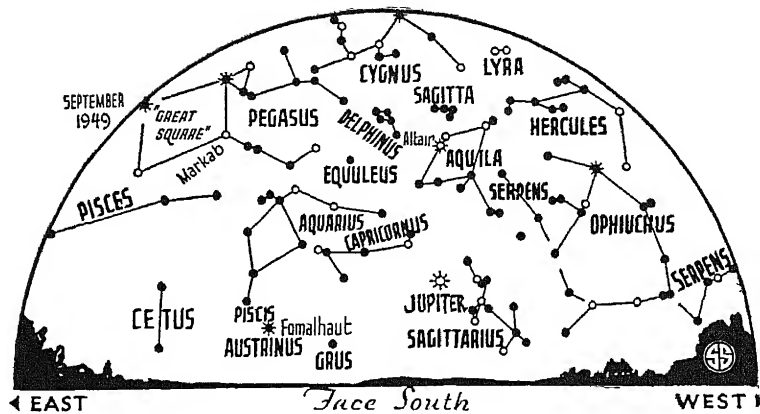
The constellation of Lyra, high in the west, has other points of interest, in addition to containing Vega, brightest star of the summer evening. If you look closely, you can see two fainter stars near it, toward the west, all three forming an equilateral triangle. The northernmost of these companions is called epsilon Lyrae, and if you have very keen eyes, or if you look at it through binoculars, you will see that it is really two stars. Through a still larger telescope, like those used by astronomers, each of these stars is also shown to be two. Thus, epsilon Lyrae is often called the "double double."

To the southeast of Vega, about three times as far as the epsilon and the other of the companions mentioned above are two more stars of the same constellation, known as beta and gamma Lyrae. Between them is a very interesting object, unfortunately not visible to the naked eye, which looks like a smoke ring when seen through a telescope. This is called the ring nebula in Lyra, and it is an example of a planetary nebula of which about 150 are known. This name is given not because they have any real relation to planets, but it was assigned by Sir William Herschel, great English astronomer of the 18th century. As he, and other early observers, scanned the heavens with their telescopes, they came across these objects, and were struck by the fact that they looked very much like the images of the planets.

Glowing Gas

The "ring" nebula is not really a ring, but a shell of glowing gas. The ring appearance comes from the fact that the globe is translucent, and we see a greater thickness of gas at the edge than at the front or back. However, these gases are extremely rarefied. Two astronomers, Leo





☉ * ○ • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS

Goldberg and Lawrence H. Aller, have illustrated this in a striking way in their excellent book, "Atoms, Stars and Nebulae." They ask you to imagine an ordinary tumbler filled with hydrogen at room temperature and pressure, to which is added a thimbleful of an and a few dust particles. If the glass were sealed, and then enlarged until it was as high as Mt. Everest and some two miles in diameter, the expanded contents would then represent a fairly accurate sample of a piece of a planetary nebula. Thus such a nebula is really a very high vacuum, better, in fact, than the best that can be secured in our terrestrial laboratories. The fact that they are so vast, averaging in diameter around a million million miles—more than 10,000 times the distance from earth to sun—means that they still contain enough atoms excited to luminescence that they can be observed.

At the center of the "ring" nebula, as with many of the planetaries, there is a star which cannot be seen even with large telescopes but which shows up plainly on the photographs. Such stars are very hot, with a surface temperature about 10 times that of the sun and shining mainly with invisible ultraviolet rays. When these rays strike the atoms of gas, they cause temporary changes in the positions of the electrons of these atoms. As these displaced electrons fall back into place, they give off energy in the form of light. This is the same as the familiar effect on earth known as fluorescence so these nebulae are actually shining by the same sort of process as that of the fluorescent electric lights which have become so popular in recent years.

Time Table for September

Sept	EST	
2	5 00 a m	Saturn in line with sun
	11 29 p m	Moon passes Jupiter
7	4 59 a m	Full moon
	6 00 p m	Mercury farthest east of sun
10	6 00 a m,	Moon farthest, distance 252,200 miles

15	9 29 a m	Moon in last quarter
18	4 56 p m	Moon passes Mars
22	7 21 a m	New moon
	11 00 p m	Moon nearest, distance 222,400 miles
23	4 06 a m	Sun over equator, autumn commences in northern hemisphere, spring in southern
25	5 17 a m	Moon passes Venus
28	11 18 p m	Moon in first quarter
30	4 46 a m	Moon passes Jupiter

Subtract one hour for CST, two hours for MST, and three for PST

Science News Letter, August 27, 1949

AERONAUTICS

Gadget Prevents Swaying Of Plane's Tail in Flight

► A GADGET to take the "Dutch Roll" out of speedy airplanes in flight was revealed by the Boeing Airplane Company. It holds the tail of the plane from swaying to right or left when side-swiped by sudden gusts of air. Its "brain" is a gyroscope out of an E-6 automatic pilot. Experimentally, it is in use on a Boeing speedy Stratojet, a plane with sweep-back wings in the 600-miles-per-hour class.

So-called Dutch Roll is not a very common occurrence, and seldom shows up until a plane is undergoing flight tests. It can be corrected by a design change, but such alteration might affect the speed. The term was applied because a plane going through the Dutch Roll looks like a Dutchman ice-skating on a Holland canal.

The gyroscope is supplemented by a turbosupercharger amplifier and a turbo waste-gate motor. The first two are on the frame of the plane, the motor is on the push rod that is used to move the plane's rudder to the right or left. When a side gust strikes the tail of the plane, the automatic gyroscopic device senses it immediately and pushes or pulls the rudder to right or left before the gust causes the plane to swerve.

Science News Letter, August 27, 1949

BLACK LIGHT

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NUCLEAR PHYSICS

Plan New Atom-Smasher

➤ A 70,000,000-volt synchrotron, one of the newest of atom-smashers, soon will be brought into the fight against cancer

Such a machine has been ordered for the University of California Medical School at San Francisco. It will be financed by the Atomic Energy Commission and constructed by the General Electric Company.

The machine will be used to explore thoroughly the indications that very high energy radiations go through normal tissue without doing much harm to them, and have nearly all their effect deep in the body.

Experiments with X-rays up to 20,000,000 electron volts have already demonstrated that this happens. Scientists feel that this principle offers great promise in the treatment of deep-seated cancers, in which one of the greatest problems is to destroy the cancer without killing the normal cells essential to the patient's well-being.

Only recently have suitable machines of high enough energy for this purpose be-

come available. They are a product of postwar atom-smashing developments.

The director of the research program for the new machine will be Dr. Robert S. Stone, noted professor of radiology at the University's Medical School and wartime head of some of the important health and safety phases of the atomic bomb project.

The new concept has been demonstrated in animal experiments using X-rays produced by betatrons up to 20,000,000 electron volts. The new synchrotron will be the first such machine applied to this work, and it will be capable of adjustment to any energy between 5,000,000 and 70,000,000 electron volts.

Because the concept is still in the experimental stage, Dr. Stone will begin work with animals. Human applications will be made as soon as the animal experiments warrant.

The project, including the machine and building to house it, will cost about \$445,000. Completion is scheduled for 1951.

Science News Letter, August 27, 1949

MEDICINE

Foresee End of Malaria

➤ ONLY a depression will keep malaria from being wiped out in the United States in the next ten years, Dr. Ernest Carroll Faust of Tulane University School of Medicine predicted to the National Academy of Medicine of Mexico.

The tropical disease expert credited the present decline in the disease to attack on the parasite causing it and the anopheles mosquito which carries the parasite. The disease would be wiped out with the elimination of either the parasite or the carrier, and this "appears near at hand," he said.

Danger lies in overconfidence or neglect to carry out the control program, he pointed out, for then malaria might gain a foothold again. A depression might foster such an attitude, Dr. Faust stated, pointing to the one in the 1930's, when drainage projects were neglected and the poor did not have enough money to buy food, clothing, medicine, or get decent housing.

That malaria has been reduced to less than 100 deaths per year today as compared with nearly 5,000 per year during 1933-1935, Dr. Faust felt, was due to the government employing men out of work for sanitation projects; improved eating habits that raised resistance to the disease; better medical care and use of new drugs such as atabrine, and better housing, with screens to keep out mosquitoes and pyrethrum sprays to kill those that got in.

The returning soldier with malaria proved to be no threat to the health of

the people, Dr. Faust stated. There were only one or two instances where civilians acquired the disease by transmission from infected soldiers. The fear of widespread infection was needless, he declared, because of the great reduction in mosquito breeding which had occurred a decade or so ago.

Science News Letter, August 27, 1949

AERONAUTICS

Fast Flight Temperatures Threat to Aluminum Alloy

➤ HIGH temperatures resulting from supersonic flight of airplanes appear to be the only important threat to the supremacy of aluminum alloy in aircraft construction, the Anglo-American joint aeronautical conference in New York was told by G. G. Green, Consolidated Vultee Aircraft Corporation, San Diego, Calif. These high temperatures are due to the friction between the air and the plane, and they become excessive at high speeds.

High-strength aluminum alloy is observed not only to be maintaining its position as the major structural material but also to be invading fields previously considered the province of steel, he said. At temperatures above 200 to 250 degrees Fahrenheit, the use of these alloys becomes doubtful. Stainless steel and what is known as Inconel X are among the best choices at 300 degrees and higher. Titan-

ium shows great promise in the range of temperatures to be encountered by aircraft flying at supersonic speeds, but it is still relatively new as a structural material.

The successful use of magnesium alloy in the structure of several current aircraft is noted as an indication of probable wider use of this material in applications not involving high temperatures.

Wing construction was also discussed by Mr. Green. The new delta wing, he said, is a logical solution of the problem of aircraft with performance extending into the supersonic range. This type of wing, already under flight test, is a triangular surface with equal sides, with the fuselage of the plane extending from the center of one side forward and beyond the opposite apex. It is an extreme swept-back construction, with the leading edge of the wing at an angle of only 30 degrees with the center line of the body of the plane.

The life of airplane structures was discussed at the same meeting by H. A. Willis of the Australian Council for Scientific and Industrial Research. His conclusion was that the factors involved are numerous, complex and interrelated, and that enough about them may never be known to make precise estimates of safe operating life. However, a thorough study of them will lead to sounder and more efficient design that will be reflected in fewer failures in service and greater safety.

Science News Letter, August 27, 1949

ORNITHOLOGY

Yellowstone Swan Census Shows Substantial Gain

➤ THE numpeter swan, America's largest, most majestic waterfowl, has gained another lap in its race against extinction. The annual swan census, just completed in Yellowstone Park by flying biologists of the U. S. Fish and Wildlife Service, shows a total population of 75 birds—54 adults and 21 cygnets. The census takers also found 15 swans when they flew over the wilderness country on the Bechler river just south of the Park, making a total of 90 for Yellowstone Park and immediately adjacent areas.

This is the highest number ever recorded in a trumpeter swan census, representing a gain of almost 50% in cygnets and 8% in adults. Last year's total count was 62, including cygnets. This year's census was taken two weeks earlier than last year's, so that the cygnet count may not be strictly comparable—this is an especially critical time for the young birds.

This year's census was the second made mainly from the air, with a certain amount of work done on foot near two lakes. The official biologist of Yellowstone National Park accompanied the Fish and Wildlife Service party as an observer.

Science News Letter, August 27, 1949

PSYCHIATRY

New Profession Pioneered

➤ A PIONEERING step toward a new profession was taken with the announcement of the fall opening of a new school which will teach psychiatry to mental hospital attendants, Dr William C Menninger, general secretary of the Menninger Foundation, Topeka, Kan., said.

The Menninger Foundation and the Topeka State Hospital will offer the teaching personnel and training for students. The program was made possible by a \$70,500 grant from the Rockefeller Foundation of New York.

"This is perhaps the most significant program in psychiatry today," Dr Menninger said. He pointed out that because psychiatric aides are in direct contact with patients, their newly-acquired knowledge will benefit the sick, and make them more competent team-workers with doctors and nurses.

Under the grant, the school is established for three years, divided into two six-month semesters for each year. Students will have a six-week rotation period between the Topeka State Hospital and the psychiatric hospitals of the Menninger Clinic. No fees

will be charged, but students have to meet certain requirements because only 25 will be admitted every six months. Students must have, as a minimum, a high school education, be between 18 and 35 years of age, be free to be employed at the Topeka State Hospital, and have well adjusted personality and aptitude for leadership.

Classes will begin Oct. 1. Applications should be sent to Dr. Bernard H. Hall, director of the educational program, Menninger Foundation.

Idea for the new school originated two years ago among a group of psychiatric aides at Winter Veterans Administration Hospital. The Rockefeller Foundation contributed \$5,500 to make a pilot study of the problem in 1947. The new program is based on the findings of this study.

Dr. Karl Menninger will be director of the new school. In addition to Dr. Hall, other staff members will be Miss Esther Lazaro, R. N., staff of the Menninger Clinic, associate director, Ream A. Lazaro, administrative assistant, and Miss Paul E. Pollard, secretary.

Science News Letter, August 27, 1949

METEOROLOGY

Ocean Weather Stations

➤ THE locations of the ten weather stations to be maintained on the North Atlantic after July 1, 1950, for the benefit of air and surface ships on transoceanic routes have now been announced by the International Civil Aviation Organization at its headquarters in Montreal.

These ten ocean weather stations will replace 13 now in use. The new network is the result of a recent meeting of the 11 member nations most concerned, held in London earlier this year. The present agreement expires on June 30, 1950, and then the new agreement will go into effect.

Six vessel stations will be maintained by the United States, the nation most concerned, with the cooperation of Canada and The Netherlands in the case of two. One will be about midway between Labrador and the southern tip of Greenland, and another well off Greenland on the route to Iceland. Another is about midway between Newfoundland and Ireland, and a fourth located between Newfoundland and the Azores. The positions of the other two American vessels will be one well off the coast of North Carolina and the other far out in the Atlantic on the same latitude.

The two vessel stations of the United Kingdom are to the south of Iceland, the more southerly one being on the Newfoundland-London route. Still farther

south will be a French station, while a Norwegian vessel will occupy waters to the west of that country.

A total of 25 vessels will be used to maintain these ten ocean-weather-reporting stations. The United States will provide 14 of them. Cooperating with the work of these floating stations, land-based stations in the United States, Canada, Greenland and Iceland will continue. Assisting also will be a Loran station on the Faeroe islands between Iceland and Scotland. Loran is a war-developed navigation aid that enables air and surface ships to get their true geographical position from two widely separated radio stations by means of direction finders that give the position relative to the two stations.

Science News Letter, August 27, 1949

GENERAL SCIENCE

Quest for Knowledge Urged in High Schools

➤ "A GREAT national quest for knowledge" to help the million or more high school boys and girls "eager to do things in science," was proposed by Watson Davis, director of Science Service.

These science-minded high school students and their teachers "need guidance,

inspiration and materials with which to work," Mr. Davis explained at the twentieth anniversary meeting at the Roscoe B. Jackson Memorial Laboratory in Bar Harbor, Me.

"America needs a great national quest for knowledge—operating in the schools and kindling the sparks of interest and genius latent in our high school youth," he declared.

Foundations for a national quest, Mr. Davis added, have been built in Science Service's Science Clubs of America, which have 15,000 clubs and a third of a million members.

"For the future of America—for peaceful living, for industrial progress, for successful democracy, for a strong and prepared nation—the quest by youth, for science understanding, must be accomplished," the Director of Science Service urged.

Science News Letter, August 27, 1949

ENGINEERING

Shadow Photographs Help Measure Electrical Fields

See Front Cover

➤ SHADOW photographs made under the powerful magnification of the electron microscope can now be used to measure tiny electrical or magnetic fields, scientists at the National Bureau of Standards disclosed.

The new photographs will show the direction and strength of the fields of the minute "atomic magnets" within magnetic materials.

In addition to providing a new tool for fundamental research in physics, Bureau officials said that the new technique will aid studies of equipment used in radio, radar and television.

The new "electron-optical shadow method" was developed during experiments on the magnetization of magnetic recording wire by Dr. L. L. Marton of the Bureau's electron physics laboratory. A wire net of non-magnetic material is used to cast an electron shadow on the screen of the microscope. The electrons, tiny negatively-charged particles which are one component of atoms, are deflected by the magnetic force of any magnetic object under the microscope. A photograph of the microscope's fluorescent screen can be studied to reveal the direction and force of the field.

The magnetic field about a small horseshoe magnet, photographed by means of the new electron-optical shadow technique is shown on this week's cover of the SCIENCE NEWS LETTER. The screen of an electron microscope shows the electron shadow of a fine wire mesh which is superposed on the image of the magnet, distorted by the deflection of the electrons as they pass through the field of the magnet. The total width of the magnet is about one-fourth inch.

Science News Letter, August 27, 1949



A Successful Family

➤ SUMMER, especially late summer, is the high burgeoning time for that great family of flowering plants that face the sun with myriad small images of himself, the Compositae. Sunflowers—half-a-hundred species of them—daisies, asters, golden-rods, compass-plants, coneflowers, blazing-stars, thistles, dandelions, and scores of other bright flower-heads shine boldly back at the summer sky with the summer sky's own colors, gold and blue.

If numbers of species and variety of forms are criteria of success in the plant world, this is the most successful of all plant families. There are well over 13,000 described species, distributed among a couple of hundred genera. Members of the family flourish from the polar regions to the tropics, from swamps to deserts, from sea level to high alpine meadows.

Most of them are of non-woody, herbaceous habit, a moderate number are shrubs. Very few of the composites can be classified as trees, and these are only small trees, growing in restricted and mostly out-of-the-way parts of the earth. This predominance of the herbaceous habit of growth is again evidence of a high degree of evolution, in the opinion of many botanists.

The flower structure of a composite is baffling to all beginning students of plant

life. Equipped with the basal knowledge of the "typical" flower's parts—sepals, petals, stamens and pistil—they are left floundering the first time they dissect a dandelion or a daisy.

The secret is that a flower of a member of the composite family is exactly what the name implies: a composite structure. It isn't a single, simple flower, but a whole society of flowers, quite small ones, crowded closely side by side. The Compositae are among plants, what bees, ants and termites are among insects—societies rather than individuals.

If you will split up one of these flower heads, you will find that the unit of floral structure is a small seed-forming body or pistil, made angular through crowding, that sits tight on a flat or convex base, the receptacle. It is very likely to have five stamens picked into a close ring.

There may be no petals at all, but if petals are present they form a one-sided, strap-like affair, as in dandelions or thistles. A trace of the original five-petaled structure may be seen in five points at the outer ends of this strap.

In many composite flower heads most of the tiny flowers (florets, to be learned about it) have lost the strap-like corolla and are crowded together in a central disk. A row of florets around the margin produce much-enlarged petaloid structures, usually called rays. This arrangement is typical of such plants as sunflowers, coneflowers and daisies. Often the ray-florets are sterile, producing no seed, their job is to entice insects to their unpetaled but fertile sister florets of the disk—a division of labor again suggesting the cooperative life of the beehive or the anthill.

Science News Letter, August 27, 1949

ENGINEERING

Servo-Mechanism Control

➤ THE magnetic fluid clutch, a device using iron particles in oil developed by the National Bureau of Standards during the past year (See SNL, April 3, 1948, p. 211), has found an early application in a new, simple, automatic control for airplanes and other mechanisms, the control being known technically as a servo system.

This servo-mechanism is described in the REVIEW OF SCIENTIFIC INSTRUMENTS by E. S. Bettis and E. R. Mann of Oak Ridge, Tenn., scientists of the Fairchild Engine and Aircraft Corporation engaged on the so-called NEPA, or Nuclear Energy for Propulsion of Aircraft, project.

In this new magnetic clutch, for which Jacob Rabinow of the Bureau's staff is responsible, the fluid used is comprised of a carbonyl iron powder suspended in light oil, in the proportions of three parts of iron to one of oil by weight. When magnetized by the field of an electric coil, the iron particles form chains which unite the driving plate on the engine shaft with the driven plate, delivering the power to the mechanism.

Servo-mechanisms have been described as instruments to translate electronic "information" into appropriate action in purely mechanical equipment. Such devices are used for power steering of large trucks, tanks, steamships and airplanes. They are also used in high-speed electronic computers.

The possibility of applying this magnetic clutch to the solution of a servo problem is apparent; the Review states. Simplicity of design and construction is one of its more practical advantages. In an operational sense, proportional power transmission control is possible with a relatively weak signal, and the system possesses inherent characteristics of high torque-inertia ratios, which offer short time responses.

Advantage may therefore be taken of the system's momentum, to supply the peak power necessary for the rapid motion of large masses.

Science News Letter, August 27, 1949

ENGINEERING

Trucks and Buses Don't Need Special Gasolines

➤ TRUCKS and buses do not need special gasolines, experts now say. The fuel ordinarily used in passenger cars satisfactorily meets the anti-knock requirements of commercial motor vehicles, the Society of Automotive Engineers, meeting in Portland, Ore., was told in a report presented by a committee which made a special survey during the past year.

The survey disclosed that while commercial-vehicle engines have somewhat lower anti-knock requirements at high speed, and tend to rate the anti-knock value of sensitive fuels slightly lower than passenger-car engines, the fuel requirements of both types are quite similar. But proper adjustment of ignition systems is very important in the case of commercial vehicles.

The survey was made at scattered locations extending from Boston to San Francisco. Vehicles of different sizes and makes were used. They were tested both on reference fuels and commercial-type gasolines, first in the condition in which they were found, and again after new distributors had been installed, worn parts replaced, and ignition systems adjusted to manufacturers' specifications.

The report was prepared jointly by J. A. Edgar, Shell Oil Co., Martinez, Calif.; H. J. Gibson, Ethyl Corporation, Detroit; R. J. Greenshields, Shell Oil Co., Wood River, Ill.; and G. W. Pusack of the Socony-Vacuum Oil Co., Paulsboro, N. J.

Science News Letter, August 27, 1949

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THE BEST SCIENCE FICTION STORIES 1949—Everett F. Bleiler and T. E. Dikty, Eds.—*Iell*, 314 p., \$2.95. Includes stories by many authors such as Ray Bradbury, Lewis Padgett, Martin Gardner, and J. J. Coupling reprinted from *Amazing Science Fiction* and other magazines for devoted fans.

DIAGNOSING BEE DISEASES IN THE APIARY—C. E. Burnside, P. Sturtevant, and E. C. Holst—*Gov't Printing Office*, 31 p., illus., paper, ten cents. The crowded living conditions in a hive makes contagious disorders spread unless detected and treated.

DRINKING'S NOT THE PROBLEM—Charles Clapp, Jr.—*Crowell*, 179 p., \$2.50. Written for the potential alcoholic by a former alcoholic.

GUADALCANAL: THE FIRST OFFENSIVE—The War in the Pacific: United States Army in World War II—John Miller, Jr.—*Gov't Printing Office*, 413 p., illus., \$4.00. The second combat volume to appear in the Army's far reaching historical project. Profusely illustrated with a hundred photographs and 36 maps.

A PROFESSIONAL GUIDE FOR JUNIOR ENGINEERS—William E. Wickenden and G. Ross Henninger—*Engineers' Council For Professional Development*, 55 p., paper, \$1.00. Presents the philosophy and engineering ethics a young engineer needs for success as viewed by the authors.

REFRIGERATION FUNDAMENTALS—*The American Society of Refrigerating Engineers*, 6th ed.,

692 p., illus., \$7.00 in U.S., \$7.50 elsewhere. Covers basic data, fundamental principles, and practices of refrigeration.

SIXTH SEMIANNUAL REPORT OF THE ATOMIC ENERGY COMMISSION JULY 1949—Atomic Energy Commission—*Gov't Printing Office*, 203 p., paper, 45 cents. This report sums up briefly the major developments and gives the status of the programs as they stood at the end of June 1949. A feature "Biology and Medicine" includes a brief description of the course of radiation illness followed for the past two years. Also published under the title *ATOMIC ENERGY AND THE LIFE SCIENCES*.

VERTEBRATE EMBRYOLOGY—Robert S. McEwen—*Holt*, 3rd ed., 699 p., illus., \$4.90. Brought completely up-to-date with attempts to clarify various passages. Includes new work on the Pig.

WONDERS OF NEPTUNE'S KINGDOM—F. Martin Duncan—*Sampson Low*, 159 p., illus., \$4.50. A description of the many wonders and problems of marine life, from the rock pools around the coasts of the British Isles to the Coral Islands. Beautifully illustrated with reproductions from the author's original photographs and drawings.

THE WORLD OF LIFE: A General Biology—Wolfgang F. Pauli—*Houghton Mifflin*, 653 p., illus., \$5.00. A college text with evolutionary approach.

Science News Letter, August 27, 1949

AERONAUTICS

Train British Fliers Here

➤ THIRTY-SIX British pilots are now in the United States, learning to fly the Boeing Stratocruiser with the help of ground equipment, the Curtiss-Wright electronic flight simulator, now the property of Pan American World Airways and used by that company to train pilots.

These pilots from England are employees of the British Overseas Airways Corporation (BOAC), and are getting ready to operate Boeing Stratocruisers soon to be delivered to the company. Pan American has already trained American pilots and flight engineers, utilizing this equipment. About eight weeks will be required for the training course of the visiting pilots.

The electronic flight simulator reproduces in great detail the flight deck or cockpit of the airplane whose performance it is designed to reproduce. It incorporates all the existing data upon which the plane itself was produced. Without leaving the ground, it can accurately simulate any condition of flight of which the plane itself is capable.

The simulator, a huge electronic-mechanical device in a model of a cockpit with

all the hundreds of dials, levers, switches and other controls which a pilot encounters in the plane, was conceived and designed by Dr. R. C. Dehmel, of the Curtiss-Wright Corporation, with the cooperation of the Boeing Aircraft Company. Similar simulators can be built to aid in training for other planes.

This flight simulator cost \$250,000 to build. It looks like a lot of money to put into a training device, but as a "training plane" it can handle four times the flight and ground crews at a tenth of the cost and in a fraction of the time involved in the use of an actual plane.

One important feature of this flight simulator is that the entire operating crew, pilot, co-pilot, engineer and others, are trained at the same time. An instructor behind them operates switches which activate the pilot's dials to indicate trouble with fuel flow, wrong oil pressure, carburetor icing, faulty spark plugs and other difficulties. Pilot response is noted by him, and also the corrective action taken. This ground training is preliminary to final training in actual flight.

Science News Letter, August 27, 1949

MEDICINE

Once-Dread Plague Is Now Victim of Modern Medicine

➤ TWO cases of bubonic plague reported in New Mexico are the first cases of the once-dread disease known in this country since 1947, records at the U. S. Public Health Service show.

The feared "black death" of the Middle Ages, bubonic plague has only been conquered effectively within the past half-dozen years. The new advances that combat plague include DDT for killing off the infected fleas on rodents which spread the disease, sulfadiazine, which has prevented plague among persons exposed to the disease, and streptomycin, which cures plague.

Although no report has been received on how the victims were infected, the disease may have been brought into the country from abroad.

Science News Letter, August 27, 1949

GEOLOGY

"Dawn Redwood" Pollen Found in Scottish Coal

➤ TREES like the recently discovered Chinese "dawn redwood" grew in Scotland between 30 and 50 million years ago.

Fossil pollen grains like those of the living Chinese tree have been found in coal mined in the town of Mull, states Dr. John B. Simpson of the Geological Survey Office, Edinburgh, in the British science journal, *NATURE* (May 14).

The fossil pollen grains in the Mull coal are practically identical in shape, size and microscopic structure with pollen brought out of the Metasequoia forest of China. Dr. Simpson has not been able to find coal-embedded pollens resembling those of either the coast redwoods or the California big trees. Nearest things to his Metasequoia pollen grains, he notes, are two species of cypress, one found in China, the other in the United States.

Science News Letter, August 27, 1949

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⚙️ **ZIPPER FIXER**, for use in the home, is a simple, inexpensive handtool that will do the job without the removal of the zipper from the clothing. It is a plier-like tool with specially shaped jaws that are slid by hand-pressure under and over the zipper to repair any ordinary "fouled-up" conditions.

Science News Letter, August 27, 1949

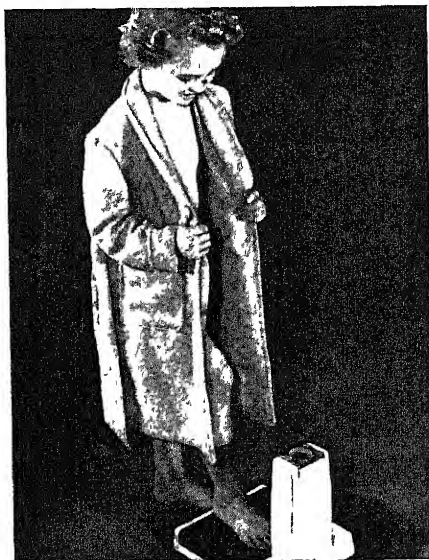
⚙️ **TEMPORARY CAP** for use on beverage bottles is close-fitting, easily attached and makes a tight seal, and features a one-inch arm which projects to one side that makes removal with one hand simple. The cap is made of a durable plastic, easily cleaned, and has a smooth upper surface on which a name can be put.

Science News Letter, August 27, 1949

⚙️ **UMBRELLA** pocket in a raincoat or overcoat, recently patented, permits the carrying of a folded umbrella in an inconspicuous position over the right front of the thigh, extending from near the hip to near the knee, where it interferes neither with walking nor sitting.

Science News Letter, August 27, 1949

⚙️ **BATHROOM SCALES**, shown in the picture, features a magnified dial on a hinged tower-like structure that is turned upward when the device is in use, but at other times is left in horizontal position,



flat on the rubber mat of the scales. The one-foot height of the plastic tower makes the dial easy to read.

Science News Letter, August 27, 1949

⚙️ **PROTECTION** device, for use with hoists and cranes to protect against overloading, is a U-shaped bar with rings to aid insertion between the crane hook and the load below. An electric switch within

the arms of the U operates to cut the current to the motor if the weight to be lifted is above rated capacity of crane and cable.

Science News Letter, August 27, 1949

⚙️ **TOY JACK**, weighing half a pound but which can be jacked up to a height of 65 inches, is an educational device for boys and can be used to jack up tricycles, wagons and similar mobile toys. An eight-inch worm gear with handle provides easy operation.

Science News Letter, August 27, 1949

⚙️ **WRESTLING MAT** covers, made of tough Vinylite plastic flexible sheeting, have perfect traction for rubber shoes, while clothing and skin slide over it freely without injury. If small holes or cuts appear in it, they can be repaired by applying cold patches to the underside from the kit accompanying the cover.

Science News Letter, August 27, 1949

⚙️ **CALCULATING WRIST** watch has a circular precision slide rule built around the dial. On turning the rim into which the watch crystal is set, the slide index, made of unbreakable glass, automatically rotates, its pointer is made to face noon where it remains, even if the rim goes on revolving, until the rim is turned the other way.

Science News Letter, August 27, 1949

Do You Know?

The so-called *bald-headed rock-fowl* of the Cameroon region, West Africa, is so rare that few white men have ever seen it.

Pure clean *water*, free from particles that might serve as nuclei for starting-points of freezing, does not begin to crystallize into ice at the ordinary freezing point of water, 32 degrees Fahrenheit, but at about zero.

By-product chemicals obtained in the manufacture of synthetic heating oil and gasoline from coal may become basic ingredients for materials for plastics, resins, lacquers, pharmaceuticals, solvents and explosives.

Germanium is an element on the chemical border line between metals and insulators, its crystals act as rectifiers in turning alternating to direct electric current, a property that permits its use in radio to replace vacuum tubes.

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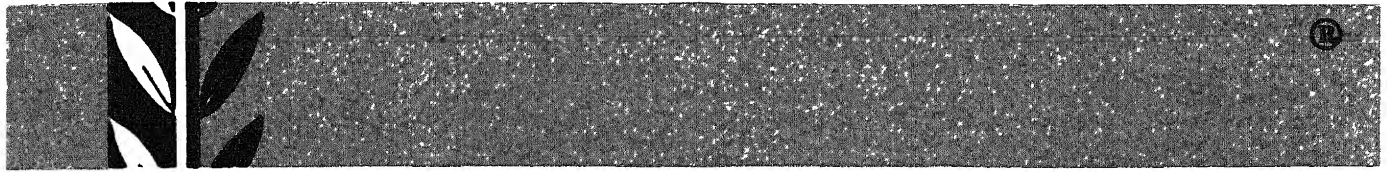
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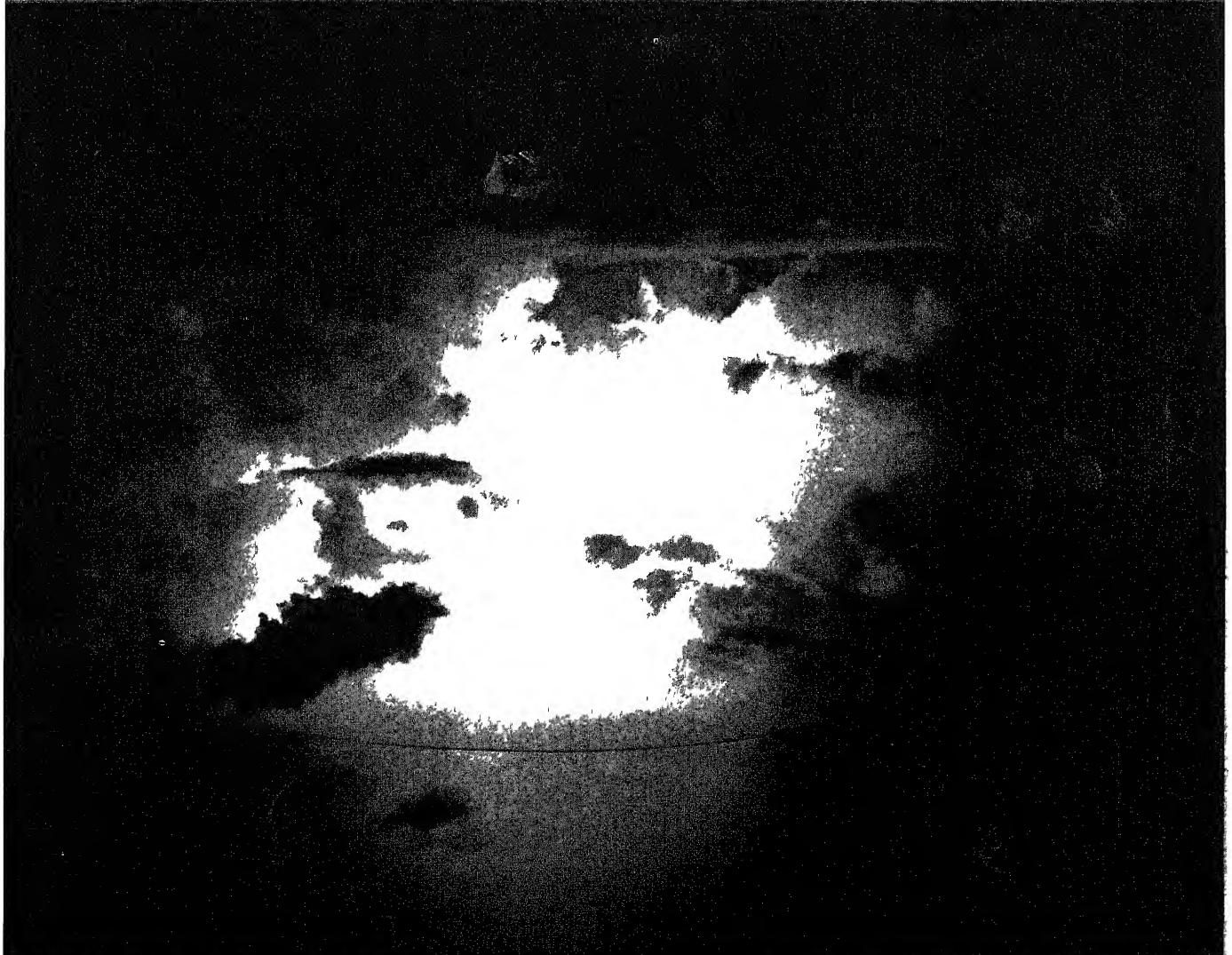
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SCIENCE NEWS LETTER



THE WEEKLY SUMMARY OF CURRENT SCIENCE



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A SCIENCE SERVICE PUBLICATION

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Biology Editor Dies

➤ DR. FRANK THONE, 58, Science Service biology editor and a well-known science reporter for the past quarter of a century, died unexpectedly in Washington on Aug. 25. Death was due to coronary occlusion.

A plant ecologist, he joined the staff of Science Service in 1924 after a brief career as college professor. As a science writer, Dr. Thone specialized in biological fields but covered a wide variety of important stories in science. He covered the famed Scopes trial at Dayton, Tenn., the evolution or "monkey" trial, in the summer of 1925, and more than two decades later was a correspondent at the atomic bomb tests at Bikini.

He was best known to many readers for his columns on nature which were widely read in many newspapers and the *Science News Letter*. Another regular newspaper feature which he authored was a weekly story on new patents.

In 1946, Dr. Thone was one of 13 recipients of George Westinghouse distinguished science writing awards.

Born in Davenport, Iowa, April 12, 1891, Frank E. A. Thone attended public school in Des Moines, Iowa, and graduated from Grinnell College in 1915. He served as a second lieutenant in the U. S. Army during the first World War and continued his education after the war at the University of

California, Johns Hopkins University and the University of Chicago where he received his Ph.D. in 1922. He taught at North Dakota State College and the University of Florida before joining the staff of Science Service.

Dr. Thone served as a naturalist at Yellowstone National Park for two summers and was the author of *Trees and Flowers of Yellowstone National Park* (J. E. Haynes, 1923). He also wrote *The Microscopic World* (J. Messner, 1940).

A member of many scientific organizations, Dr. Thone was active in the affairs of the American Association for the Advancement of Science, the Washington Academy of Sciences and the National Association of Science Writers. He was a member of Sigma Xi, Phi Beta Kappa, Botanical Society of America, American Society of Plant Physiologists, American Society of Mammalogists, Seismological Society of America, The Wildlife Society, National Parks Association, Biological Society of Washington, Botanical Society of Washington, Wild Flower Preservation Society, Overseas Writers, Outdoor Writers Association, Catholic Commission on Intellectual and Cultural Affairs and the Cosmos Club.

Dr. Thone is survived by his mother, Mrs. Mary Anna Thone, and a sister, Margaret Thone, both of Des Moines.

Science News Letter, September 3, 1949



DR. FRANK THONE

ASTRONOMY

Adopt "New Look" in Domes for New Telescopes

➤ THE "new look" in domes has come to the student observatory at the University of Denver's Chamberlain Observatory.

After 58 years with a single-slit dome, the observatory has received a new, wider aperture to accommodate three new telescopes donated by two Denver men.

The new equipment—a 12-inch Newtonian reflecting telescope, an eight-inch Schmidt-type telescopic camera and an eight-inch Cassegrainian reflecting telescope—will replace the six-inch refractor 'scope mounted in 1891 by the observatory's first director, the late Dean Heibert A. Howe.

The present director, Dr. Albert W. Recht, said the new equipment will be used to supplement the main observatory's 20-inch refractor telescope and would be used, specifically, to "catch up" on asteroid and comet observations which had to be neglected during the war.

Science News Letter, September 3, 1949

CHEMISTRY-BOTANY

Salt in Water Will Kill Weeds in Beet Fields

➤ THERE'S no need to use some of the potent new chemicals with complicated names if you want to kill many of the weeds found in beet fields.

Experiments at the New York State Agricultural Experiment Station show that many of the common weeds can be destroyed with a spray containing 200 pounds of salt in 100 gallons of water.

Science News Letter, September 3, 1949

MEDICINE

Mice Exposing Man's Ills

➤ FROM mice whose heritage can be traced back more generations than any human being, there may come the living materials with which scientists will solve problems in human behavior, mental illnesses and chronic and degenerative diseases, Dr. W. E. Heston of the National Cancer Institute, Bethesda, Md., told the twentieth anniversary meeting of the Roscoe B. Jackson Memorial Laboratory in Bar Harbor, Maine.

One of the greatest hopes for attacking medical problems of the future lies in the development of kinds of mice that inherit many other diseases just as some lines of mice hand down cancer to their progeny in as high as 98% of the animals.

To get even more information about cancer, many more inbred strains of mice susceptible to various kinds of disease are needed, and Dr. Heston urged greater effort to create them by breeding.

Other animals are likely to give scientists new information about the diseases of fighting and aggression which, among human beings, cause so much trouble in the world and threaten to precipitate world war. Jackson Laboratory is developing a particularly ferocious and aggressive kind of rabbit

which will snap at anything that is poked into its cage. Most rabbits, like most people, are relatively peaceful and harmless.

From experiments on ferocious rabbits and their kind, it will be possible, scientists believe, to learn more about fundamental reasons why other animals, including man, fight and perhaps even go to war.

The thousands of mice which are reared and studied at Jackson Laboratory are in general not aggressive creatures. Due to the fact that they multiply much faster than even the proverbial rabbits, their speedy reproduction aids study of kinds of diseases that can be genetically concentrated in them.

If mice can be found that have the crippled joints of arthritis or the damaged hearts of cardiac victims, they can then be used to test suggested treatments for these chronic diseases or to explore into their cause.

Some Bar Harbor mice are being tested for their reaction to insulin and electric shock as a step toward an experimental study for this method of treating some forms of mental illness in human beings.

Science News Letter, September 3, 1949

CHEMISTRY

Sources for Creating Food

Future nourishment for a hungry world may come from yeasts, seaweed, algae and wood. Scientists all over the world are working to make this practical.

➤ FOR the future populations of the world, that otherwise may be hungry, let them eat yeasts, seaweed, and algae and wood.

The dining rooms of the United Nations do not feature such unusual foods today nor will they in the near future. But the UN Conference on Conservation and Utilization of Resources meeting in Lake Success, N. Y., discussed just how soon and by what methods such "creatable resources" can be turned to practical use.

A most promising discovery is that a special microorganism, called *Rhodotorula gracilis* or more simply fat yeast, produces in its cells a substance that is 50% to 60% fat. Because fat is one of the foods in shortest supply, this is exciting practical-minded technologists. The kinds of fatty acids in the yeast fat are rather close to palm oil fat. The yeast fat also contains some of the vitamin B complex and the stuff from which vitamins A and D are made. A hundred pounds of sugar fed to this yeast produces 165 pounds of fat, as well as a quarter that amount of protein. The sugar used can be in molasses of lowest grade.

A report by Dr. Harry Lundin of Sweden's Royal Institute of Technology, Stockholm, shows that the dry matter in fat yeast costs about 13 cents a pound and that a desirable mixture of fat and protein should be manufactured by a practical continuous process. First the yeast is allowed to grow for 10 hours with a moderate amount of fat in its cells. Then it is put through a fattening phase for two days when it converts the sugar to fat at a great rate.

Britain turned to yeast for possible cattle feeding when a Nazi blockade threatened in 1940 just as the hard-pressed Kaiser's government in 1915 studied yeast manufacture from inorganic nitrogen. This was revealed by Dr. A. C. Thaysen, who reported from Britain's Colonial Microbiological Research Institute at Trinidad. Since 1944 there has been in Jamaica a successful food yeast factory, producing material suitable for human consumption.

The yeast itself can be fed on sugar made from wood, Dr. J. A. Hall of the U. S. Forest Service at Portland, Ore., reported. Or molasses made from wood can be fed directly to livestock, as shown in many U. S. agricultural college tests.

As for seaweed, used for centuries as laver bread fried for breakfast in the case of the reddish or sea lettuce sort in Scotland, Dr. F. N. Woodward, director of the Scottish Seaweed Research Association, pre-

dicted that the greatest use of marine algae will be in providing raw chemical materials, including alginic acid now used in food, drugs, cosmetics and textiles, and newer chemicals called mannitol, laminarin and fucoidin, that correspond roughly to the sugar and starch of land plants.

Science News Letter, September 3, 1949

BIOCHEMISTRY

Substance in Potatoes May Aid Body Use Proteins

➤ POTATOES may contain mysterious substances which help the body make better use of proteins.

This discovery was reported to the First International Congress of Biochemistry in Cambridge, England, by two British scientists, Dame Harriette Chick and Dr. E. B. Slack.

Young rats doubled their growth rate when the non-protein nitrogenous potato

substances were substituted for one-fourth of the wheat protein in their diet. The researchers said that this cannot be explained on the basis of supplying essential amino acids, building blocks of protein. They believe some unknown mechanism is involved.

Science News Letter, September 3, 1949

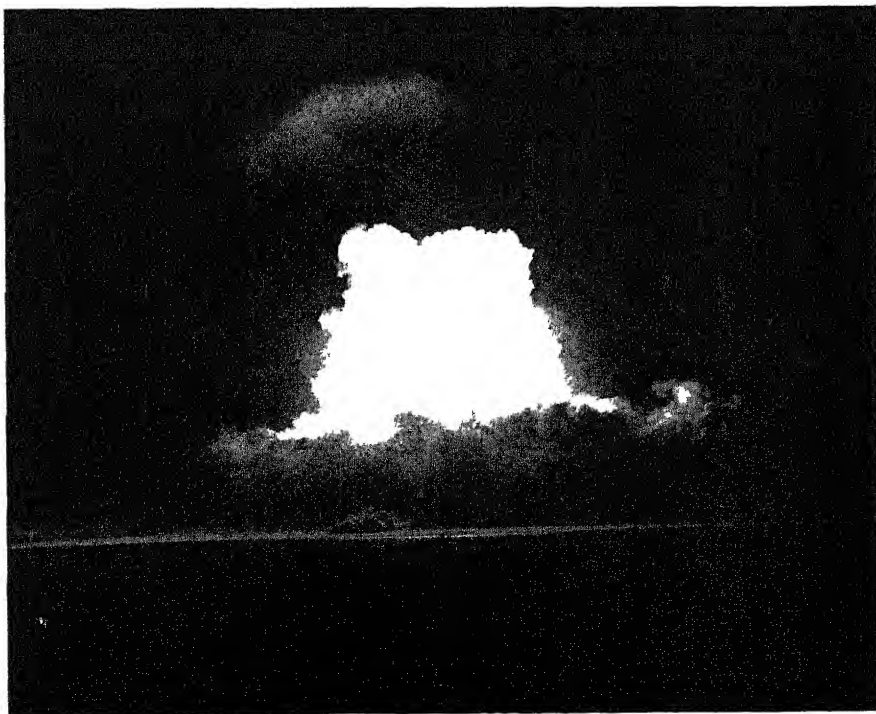
On This Week's Cover

➤ "FIREBALL and shockwave of an atomic bomb explosion, during the tests held at Eniwetok," is the terse official statement from the Atomic Energy Commission which has just released a series of pictures taken of the atomic bomb bursts in the Pacific.

The bombs worked, and the tests yielded the required information, Lieut. Gen. John E. Hall, commander of the Joint Task Force Seven, stated at the conclusion of the tests held in April and May, 1948.

It was pointed out that these tests were not to be confused with the Bikini tests which were made to find the effects of atomic explosions on naval materiel and equipment as well as on animal and marine life. The purpose of this second series of tests was to find answers to questions on the military applications of atomic energy.

Science News Letter, September 3, 1949



TESTING THE ATOM BOMB AT ENIWETOK—This is one in a series of pictures showing the successful explosion of an atom bomb in tests made in April and May, 1948, in the Pacific, which have just been released by the Atomic Energy Commission. Official comment, beyond expressing satisfaction with the results of the test, is confined to designating it as a "burst of an atom bomb during the experimental tests at Eniwetok."

MEDICINE

Pregnancy Illness Relief

➤ **RELIEF** from the nausea and vomiting which afflict one-fourth to one-half of expectant mothers may be had through daily doses of the new anti-seasickness remedy, Dramamine, scientists at Johns Hopkins University and Hospital in Baltimore are finding.

Complete relief of symptoms three hours after taking the drug was experienced by 31 of 43 women, Drs Paul E Carliner, H Melvin Radman and Leslie N Gay reported in the journal, *SCIENCE* (Aug 26)

These 43 women had suffered nausea and vomiting for four to six weeks. A number of remedies, including some of the B vitamins, sedative drugs and psychiatric treatment, had failed to relieve their symptoms.

Substitute pills of milk sugar (lactose) that looked just like the Dramamine pills were given to 10 women, without their knowing the change had been made. Dramamine had controlled their symptoms, but when they got the substitute pills they relapsed. They regained their normal health after Dramamine was given again.

The drug failed to give relief to 12 of the 43 women.

Although nausea and vomiting may affect as many as half of all expectant mothers, the severity varies. Frequently it is necessary for the patients to be taken to a hospital for treatment because of the dehydration, or loss of water, that occurs. The cause of the condition has never been established. Occasionally, about once in 15,000 pregnancies, the condition is so severe that it is necessary to stop the pregnancy to save the mother.

The results with Dramamine in this condition are so encouraging that an extensive comparative study is being made at the Johns Hopkins Hospital. Dramamine was developed by scientists at G D Searle and

Co of Chicago as a possible remedy for hayfever and other allergies. Its value in stopping car sickness, accidentally discovered through the experience of an allergy patient at the Johns Hopkins allergy clinic, led to its trial, with successful results, as a remedy for other forms of motion sickness, including seasickness and airsickness.

Science News Letter, September 3, 1949

ICHTHYOLOGY

Fish Can Feed Millions In Warm Parts of Earth

➤ **FISH** can feed the millions of growing population in the warm parts of the earth, a leading Indian zoologist stated at the United Nations Scientific Conference on the Conservation and Utilization of Resources at Lake Success, N Y. Almost any little body of water can be made to produce food at less cost and with a yield much higher than can be obtained from dry land farming.

Dr Sunder Lal Hora, who is director of India's Zoological Survey at Calcutta, recommended that other countries follow the example of China, India and other Asiatic nations in raising fish for food, often in the same fields that rice is grown.

Not only do fish produce food for the table but they control the disease of malaria by feeding on the larvae of these insects.

A great advantage of fish farming is that it utilizes materials of the soil and added waste material without competing with ordinary farming.

Often two species of fish eating different kinds of food can be grown in the same pond, making the water do double duty.

Little capital is needed to start fish farming, Dr. Hora said, and pond culture pro-

motes a happy village life as well as furnishing needed addition of protective food to the diet.

Science News Letter, September 3, 1949

Wild burros are the worst threat to the vegetation and water supplies in some western national parks.

The *fishing industry*, one of America's oldest, is composed of about 4,000 shore establishments, 8,000 vessels of five tons or more, and 73,000 smaller fishing craft.

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MEDICINE

How are mice contributing to human health? p 146

How many hayfever victims are there at present? p 151.

Photographs Cover, p 147, Atomic Energy Commission, p 149, Goodyear Tire and Rubber Co., p 151, General Electric Co., p 154, p 155, Food and Agriculture Organization.

What disease has for the first time been granted compensation? p 151

What drug gives relief to ill pregnant women? p 148

NUCLEAR PHYSICS

What is the status of Dr. Peter Kapitza, noted Russian atom scientist? p 149.

VETERINARY MEDICINE

What and how are some of the animal diseases being attacked? p 154

NUCLEAR PHYSICS

Russian Atom Scientist

If the Soviets have an atomic bomb, it now seems certain it was not built by the world-famous Dr. Kapitza. He has been relegated to the Communist dog-house.

➤ IF Russia has the atomic bomb or is close to achieving it, it is not because of the work of the world-famous Dr. Peter Leonidovich Kapitza, British-trained physicist who once worked in the Cavendish laboratories of the late Lord Rutherford at Cambridge (See SNL, July 23, p. 54).

For Kapitza has been in virtual retirement, not of his own choosing, living for the past two years or so in a country house not far from Moscow. He was neither banished to Siberia, as some rumors had it, nor did he disappear to play an important part in Soviet atomic energy research.

He has been in the Communist dog-house, but it was because his plans for tripling the production of steel in the USSR through use of liquid oxygen did not work out as promised, although they were partially successful.

Information is that Kapitza is actually back in Moscow working rather obscurely in a laboratory much less important than the one that he headed for years before and during the war.

Until the spring of 1935, Kapitza had been working in England at Cambridge on low-temperature problems. The Mond laboratory had been dedicated there in 1932 with powerful magnets that for a fraction of a second could produce a magnetic field more than a million times as great as the earth's magnetic field. Kapitza was using such apparatus in an attack on the secrets of the atom and physical laws.

He went back to Russia for what he thought to be just a visit. His passport was cancelled, and it was announced that he was "detained." The Soviet authorities wanted Kapitza's researches to be done at home.

So the British decided that it was better for the world to have Kapitza using the special equipment provided for him at Cambridge than to have Kapitza and the apparatus both idle and unused. So they sold the electromagnets and other equipment to the Russian government and they were moved to Moscow.

Interestingly, the money obtained was used to purchase for England its first cyclotron, which proved so important in atomic search.

Kapitza in his Moscow Institute for Physical Problems was fruitful. He did pioneering research on the very low temperatures near absolute zero where metals show little or no electrical resistance. He discovered that liquid helium, for instance, exhibits zero viscosity.

An outgrowth of this work was the invention by Kapitza of a turbine for production of oxygen at a low cost. It was reported

to be a sixth of the size of conventional installations and it operated at four atmospheres instead of 200 atmospheres. It also began to produce oxygen very quickly and, combined with a nitrogen removal system, was suitable for the industrial production of oxygen. When a party of American scientists went to Russia just after the fall of Germany in 1945, Dr. Irving Langmuir, the General Electric chemist and Nobelist, learned from Kapitza that Soviet oxygen liquefaction units were supposed to produce oxygen at one-thirtieth the cost of the best units used by the Germans during the war in rocket fuel production.

The cheap oxygen was to be used in new methods of steel production in the Donbas and Soviet Asia and \$2,000,000,000 were supposed to be spent on this gigantic project, financially of the order of the USA atomic bomb Manhattan project, which of course at that time the Soviet did not know.

Despite the fact that in 1945 200 tons of steel daily was reported being made in a pilot plant at Kapitza's institute, at a cost of about 25% to 30% that of ordinary blast furnaces, evidently the process did

not work out as expected or something else happened. In any event, Kapitza lost face and his job. Toward the end of 1946 it was rumored that he had been sent to Siberia, presumably because he wasn't working on atomic energy.

Even if the rosy prospects of cheaper Soviet steel, thanks to Kapitza's oxygen, have not been completely fulfilled, oxygen is beginning to aid steel production in the United States, England and elsewhere.

Most immediate use of oxygen contemplated in the steel industry is in the open hearth process, the enriched air being blown in at the junction of the metal and the slag to speed the removal of the unwanted elements from the steel being manufactured.

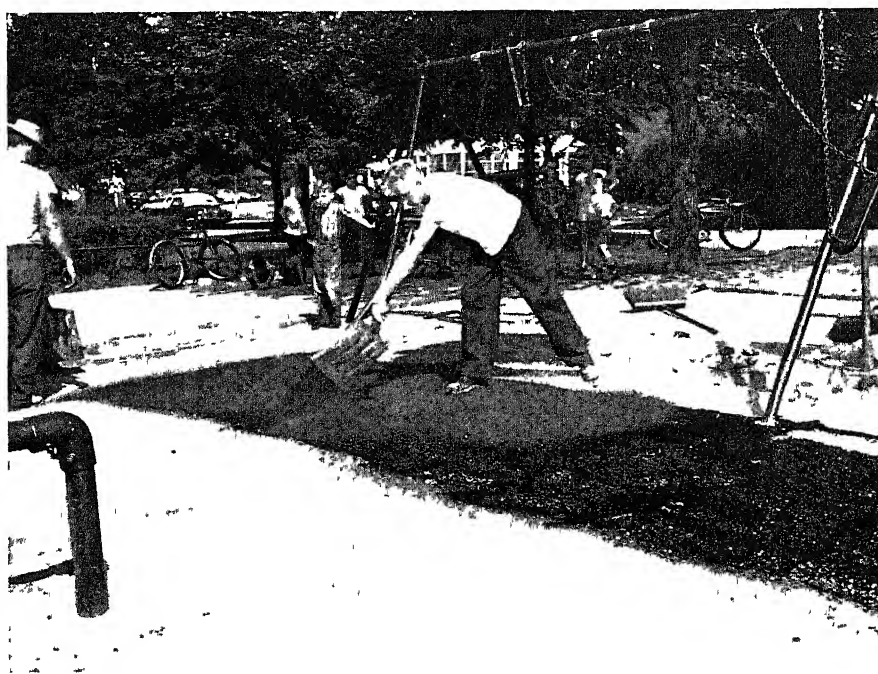
Several steel companies have pilot plants based on this process in actual operation, but none of them are going all out for the use of large amounts of oxygen in steel production, so far as can be learned. Oxygen can also be applied to the electric furnace, to steel-making converters and to a lesser extent the blast furnaces that produce pig iron primarily.

Science News Letter, September 3, 1949

ENGINEERING

Playgrounds with Rubber Surfaces Are Under Trial

➤ PLAYGROUND children may soon be bouncing around on a rubber surface, saving shoe leather, clothing and the danger of skinned arms, legs and faces. A test in-



RUBBER-SURFACED PLAYGROUND—Ground-up rubber was mixed in asphalt for this test-installation of a new surface. It will mean a saving in shoe leather and clothing and will prevent skinned arms, legs and faces in accidental falls.

stallation of a rubber-surfaced playground is now on trial in Akron, Ohio, at one of the city schools

In this new surface, ground-up rubber replaces the conventional crushed slag in an asphalt mixture. Crushed stone is used as a foundation. Over this is spread a "hot-mix" asphalt. This base is then covered with a half-inch of ground rubber, which is rolled to impregnate the rubber particles into the asphalt.

The material is somewhat similar to that

used on the so-called rubber roads installed in the Netherlands before the war, and later in England. Five test sections of such roads are now being laid in the United States. There is an important difference: the playground surface is entirely free of abrasive particles.

The rubber-surfaced playground installation was made by the Portage Bituminous Company. Goodyear Tire and Rubber Company supplied the rubber.

Science News Letter, September 3, 1949

San Francisco by Julius H. Hagenguth of General Electric.

The G. E. scientist is engineer in charge of the company's High Voltage Engineering Laboratory at Pittsfield, Mass., and he described results of experiments on lightning stroke damage to aircraft conducted through several years in collaboration with the National Advisory Committee for Aeronautics.

Lightning is not a serious hazard to properly protected planes, he indicated, but non-metallic planes, unless well shielded with a network of wires or other protective coating, are subject to damage from even minor lightning strokes of the order of 20,000 amperes, which may make the plane inoperable, he said.

Subjects investigated during the study were listed as the burning of holes in the skin and metallic parts of planes, damage to fuel tanks, breaking of safety glass in windshields, effect of current flow through ball bearings of the control systems, effect of lightning on the pilot's vision and other possible damages.

The principal effect to a metal plane's skin from a continuous stroke was found to be a small hole burned in the metal. Although the type of metal appears to have little influence on the effect, he said, the holes differ in physical appearance.

Concerning effects of lightning flashes on the vision of a pilot, he stated that the pilot must be looking at the exact channel of the stroke to be affected at all, and the probability of such an occurrence is very small. He reported on the results of an investigation with artificial lightning on observers' eyes protected with special goggles. From 29 to 47 seconds were required before sight was restored to the protected eyes. For others a longer time might be required. But, he added, the threat of blindness is not enough to advise pilots to wear goggles.

Science News Letter, September 3, 1949

PSYCHIATRY

Hormone for Mental Ill?

➤ PATIENTS with the serious mental disease, schizophrenia, may at some time in the future be among those who will benefit from the present search for new sources of cortisone, powerful new weapon against arthritis and rheumatic fever.

Latest search for bigger sources of this chemical include a U. S. Public Health Service-Department of Agriculture expedition to Switzerland and Africa to look into plant sources of a starting chemical for manufacture of cortisone.

Because the supply of cortisone is so very small at present, it undoubtedly will be a long time before schizophrenic patients generally will be treated with it. And it may not prove successful in this disease.

But the outer rind, or cortex, of the adrenal glands which is the body's normal source of the hormone is known to be involved in schizophrenia. The part of the body-mind mechanism which fails under stress, resulting in schizophrenia, is the mechanism whereby the adrenal gland cor-

tex normally responds to stimulation by a hormone from the pituitary gland in the head. In schizophrenia this mechanism goes wrong and the adrenal cortex fails to respond. Drs. Hudson Hoagland and Gregory Pincus of the Worcester, Mass., Foundation for Experimental Biology have discovered.

They discovered this by giving injections of the pituitary gland hormone, called ACTH, to schizophrenic patients, normal persons and patients with less serious mental illness termed psychoneurosis. The schizophrenic patients did not respond to the pituitary hormone until they had been given three and four times the amount that brought response in normal and psychoneurotic persons.

Cortisone itself may or may not be effective in schizophrenia. But when larger supplies of it and other related chemicals are available, the problem of this widespread mental disease may be much nearer to solution.

Science News Letter, September 3, 1949

ASTRONOMY

Pole Star Is "Temporary"

➤ POLARIS, our pole star, is only a "temporary" occupant of that position.

We call Polaris, or alpha Ursae Minoris, the pole star because the northern end of the earth's axis happens to point nearly towards it. But the earth's axis "wobbles" so that other stars have been and will be pole stars.

About 5000 years ago when the pyramids were built in Egypt, Thuban, a star in the constellation of Draco, the dragon, was the pole star.

Around the year 13,000 A. D., our pole star will be Vega, in the constellation of Lyra, the lyre.

The movement of the earth's axis, called "the precession of the equinoxes," takes about 25,800 years to trace out a circle. Polaris at present is about a degree away from the exact line of the axis, but is getting closer to it all the time. About the middle of the next century, it will be

nearest, and then it will move out of line again.

We think of Polaris as a single star, but actually it is a small stellar family. To the naked eye, it is seen as one star. Through a good telescope, a faint companion star is seen, and the brighter one is revealed as a triple star.

Science News Letter, September 3, 1949

AERONAUTICS

All-Metal Planes Safe From Lightning Strokes

➤ LIGHTNING strokes are practically harmless to flying airplanes with all-metal "skins", while wooden or plastic planes might suffer damage by lightning penetrating the outside covering to reach engines and metal parts within, the American Institute of Electrical Engineers was told in

BIOCHEMISTRY

New Chemical Weapon Tested Against Cancer

➤ A LONG-NAME chemical which has produced small but useful improvement in some cases of cancer was described to the First International Congress of Biochemistry held in Cambridge, England, by Prof. J. S. Mitchell of Cambridge University.

The chemical—tetrasodium 2-methyl 1,4-naphthohydroquinone diphosphate—was injected in large doses into the veins and muscles of 240 patients with various types of advanced malignant tumors. Some of the patients also received relieving doses of X-rays, but regression and degeneration in one type of cancer cells, adenocarcinoma, was produced using the chemical alone. Prof. Mitchell said that the chemical has low toxicity.

Science News Letter, September 3, 1949

MEDICINE

Hayfever Has Increased

Estimates point to over 4,000,000 victims of the disease at present. "Shots" of the pollen are the best means for controlling the hayfever.

➤ HAYFEVER sufferers have more company in their misery now than they did some years ago. The a-choo ailment is "definitely a disease of civilization" and during recent years there has been an increase in cases of hayfever and other allergies, specialists agree.

A conservative estimate by authorities places the number of pollen hayfever victims in the United States now at three per cent of the entire population, or considerably over 4,000,000 persons, says Dr. Fred Wittich, secretary of the American College of Allergists.

The hayfever victim's best hope for effective control of his disease lies in proper methods of immunization, or desensitization as it is sometimes called. This consists in regular "shots" of gradually increasing doses of the pollens that cause his trouble. Specialists say these should be given months before the hayfever season starts, so that the patient gets well immunized or desensitized by the time he is exposed to quantities of the pollens in the air. But for those who do not get started early, "shots" during the hayfever season offer some help.

Results of immunization give greater relief, Dr. Wittich says, when the new hayfever drugs, antihistamines and epinephrin-like substances, are used during the hayfever season. These newer drugs do not keep the pollens from entering the nose, however, so if the patient is not receiving protection through immunization, the "shock" organ may change from the nose to lower in the breathing tract and cause asthma.

The most beneficial results are obtained

when these new drugs are used in conjunction with immunization measures for preventing reactions from the immunizations. Used in this way, the drugs permit increasing the maximum dose of pollen extract above that which the patient can stand when pollen extracts are given alone.

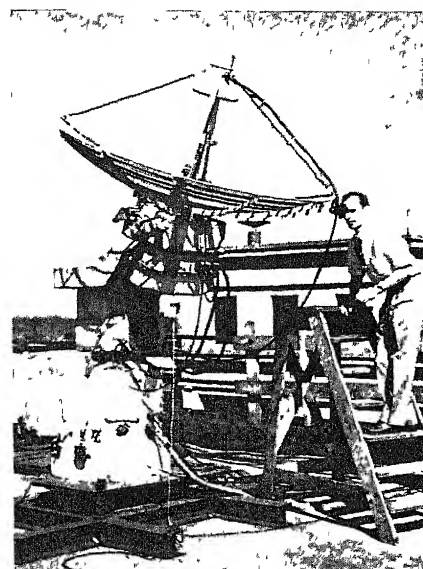
The drugs must be suited to the individual case, however. As Dr. Harry Bernton, allergy specialist of Washington, puts it, "It's anyone's guess what any one drug will do for any one patient."

Reasons given by authorities for the increase in number of hayfever victims in recent years are: 1. More people and more physicians are becoming allergy conscious. 2. Plant vegetation has increased, particularly in the case of weeds such as ragweed which thrive on land turned over in road building and other projects. (This in spite of attempts by many communities to wipe out weeds, because eradication of any plant species is considered almost impossible.) 3. More people are moving about, migrating to the suburbs, or travelling about the country. 4. The tensions of our way of life probably play a part in the increase in allergies in general.

This last is an important factor, in Dr. Bernton's opinion. He thinks it is why he is seeing hayfever and asthma in young children with no family history of allergy, which is usually a familial or hereditary condition.

Dr. Bernton is considering a study of allergies in displaced persons in Europe, to see whether there is a relation between allergic diseases and emotional and nervous tensions.

Science News Letter, September 3, 1949



ANALYZING CLOUDS—A weather balloon, which will radio data 120 times per minute to the ground equipment, is being automatically tracked by this antenna. The airborne equipment will reveal the thickness, height, and density of clouds.

their readings are safe because they have been made a permanent record by the ground receivers in operation during the balloon's flight.

Science News Letter, September 3, 1949

MEDICINE

Jaundice Acquired on Job Is Granted Compensation

➤ COMPENSATION has been granted for the first time for the contraction of jaundice which developed from the prick of a needle used in withdrawing an infected donor's blood. This has opened the way to a new compensable occupational hazard, four New York doctors declared.

Compensation was awarded a woman blood bank worker who got jaundice by accidentally pricking her hand and fingers with the needles used in withdrawing blood from donors. Drs. Sidney Leibowitz, Louis Greenwald, Ira Cohen, and Joseph Litwinski of Beth Israel Hospital reported in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Aug. 27).

The danger of transmitting the virus causing jaundice via the blood of donor to patient has previously been recognized, they pointed out. But infection in nurses, doctors and technicians performing this operation has been rare.

This case is important in two respects. It serves as a warning to medical personnel of the danger of accidental self-inoculation and is the first known case to get compensation for contracting the disease.

Science News Letter, September 3, 1949

METEOROLOGY

Device Gets Cloud Data

➤ THE height of the base of a cloud above the earth has long been measurable, but a new instrument revealed by General Electric gives the height of the cloud at its summit as well as at its base, and it also indicates the density of the cloud.

The instrument, called a cloud analyzer, is designed to be carried aloft by a weather balloon which climbs into the upper atmosphere at a speed of about 1,200 feet per minute. It carries its own tiny radio transmitter, and sends data to the ground receiver at a rate of 120 times a minute. The balloon carries other instruments to provide data on temperature, air pressure and humidity.

The heart of the new instrument is a piece of string, saturated with a salt solution, through which an electric current is passed. Resistance readings indicate the liquid water content of the cloud. In passing through a cloud, the string picks up moisture and becomes a better conductor of electricity. A low resistance indicates water or rain. An increase in resistance indicates a decrease in the amount of liquid water in the air.

The balloon used climbs to about 75,000 feet, where it bursts because of the greatly decreased atmospheric pressure. The instruments in it are lowered safely to the ground by tiny parachutes. Even if lost,

AGRICULTURE

World Food Fund Proposed At UNSCCUR Conference

➤ A WORLD Food Fund, to be established by the member countries of the United Nations, was proposed by Sir Herbert Broadley, KBE, deputy director-general of F A O, at the United Nations Scientific Conference on the Conservation and Utilization of Resources, Lake Success, N Y.

This fund, Sir Herbert explained, would not be expected to provide capital for a world program of increased food production neither would it be called on to finance commercial transactions in the commodity field. Its purpose would be to "provide the resources for accurately measuring the possibilities, organizing the necessary research, planning the strategy of the international food campaign, and training those upon whom will fall the responsibility of directing the tactical operations of that campaign."

The world's increased food needs are measurable in almost astronomic figures, the speaker pointed out. To lift the curse of chronic hunger from the planet's increasing population, there must be by 1960 an annual production of 60,000,000 tons of cereals more than in prewar years, of 30,000,000 more tons of meat, of 250,000,000 more tons of fruit and vegetables, and of 35,000,000,000 more gallons of milk.

To meet these stupendous needs it will be necessary to use every possible means of encouraging greater production, Sir Herbert declared. More efficient use of lands now under cultivation, restoration of worn-out and abandoned soils through soil-conservation practices and irrigation, opening up of new lands, and improved transportation and distribution of products are among the things that must be done. Beginnings have been made, but they are only beginnings, he insisted. The cooperation of all peoples is necessary if chronic hunger is to be banished from the world.

Science News Letter, September 3, 1949

CHEMISTRY

Chocolate for Candy Now Made by One-Step Process

➤ CHOCOLATE for candy bars and other confections can now be made by modern scientific methods instead of by the usual rule-of-the-thumb method.

A one-step process of chocolate making, recently patented, is reported to give a much finer, tastier confection than heretofore obtained.

This new method will also allow a small manufacturer to go into the chocolate-making business with comparatively little capital and with a greatly reduced labor force, explains Justin J. Alikonis of the Paul F. Beich Company, Bloomington, Ill.

Basis of the one-step process is simultaneous air flotation of cocoa nibs and milk,

powder, salt and other dry ingredients. Nibs are the chocolate particles obtained when cocoa beans are roasted and cracked open.

Temperature is kept below the melting point of the cocoa butter in the chocolate nibs. The nibs are roasted to the desired moisture content and cooled before being mixed with other ingredients.

Candy manufacturers, declares Mr. Alikonis, can save power, repair and maintenance costs and reduce their labor force as well as improve product quality using the new method.

Science News Letter, September 3, 1949

MEDICINE

Undercooked Polar Bear Meat May Transmit Disease

➤ LATEST health tip to vacationers in the very far north is to beware of undercooked polar bear and walrus meat. They might get trichinosis from it, warns the American Veterinary Medical Association in Chicago.

More usual source of trichinosis is undercooked pork that has the wormy germs, called trichinae, in it.

The disease hit 15 men on an expedition when they sampled raw or rare polar bear steak, one veterinary medical journal reports. And Eskimos are reported to have contracted the disease from eating walrus meat.

Science News Letter, September 3, 1949

NUTRITION

Freezing Will Not Make Those Steaks Tenderer

➤ THE notion that freezing meat will make it more tender is false, according to research findings at Cornell University. While there's an even chance of the meat becoming slightly more tender or slightly tougher, the difference either way is slight.

Neither does rate of freezing make much difference. There was more variation in tenderness between steaks cut from different carcasses than between steaks frozen at different rates.

The preliminary work also indicated that neither freezing nor rate of freezing has much effect on vitamin B content. After six months of storage, however, riboflavin content decreased markedly, while pantothenic acid and pyridoxine decreased slightly but consistently during that period.

"A turnover of all foods in the freezer at least once a year should result in little if any vitamin loss in freezer stored foods," said Prof. J. J. Wanderstock.

Other results show that storage temperatures must not be allowed to fluctuate above zero if the eating qualities and nutritive values of frozen foods are to remain constant. Pork, for example, easily becomes rancid under such conditions even after as short a period as four months.

Science News Letter, September 3, 1949



MEDICINE

Penicillin Fails as Cold Preventive in Trials

➤ HOPE that daily prophylactic doses of penicillin would keep people from catching colds and other respiratory ailments and losing time from work on account of such illness can be given up in the light of a report to the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Aug. 27).

The report is by Drs. Clifford Kuh and Morris F. Collen of the Permanente Hospitals at Oakland, Calif. These hospitals are part of the Permanente Health Plan established by Henry Kaiser early in the war for workers in his shipyards and their families.

Large-scale trial of daily penicillin doses as prophylaxis against nose, throat and similar illnesses was carried out for one year among members of the Permanente Health Plan who volunteered to take part in the trial.

The results of this trial were negative, Drs. Kuh and Collen report. Of the 2,937 volunteers, 1,486 were given twice-daily doses of penicillin pills. The other 1,451 were given pills of a harmless chalk mixture (calcium carbonate). Records at the end of the period showed practically no difference between the two groups in amount of respiratory or other illness, days lost from work or regular activities, days in hospital or number of persons who sought medical attention.

None of the volunteers knew which kind of pills they were getting. They were given a month's supply of pills at a time, and had to report in person to the hospital for the next month's supply. At the time of each monthly report, information was obtained as to whether they had been sick, what illness they had had, whether they had lost time from work on account of it and whether they had been in the hospital for any illness. Many of the original group dropped out in the course of the year, but several hundred carried through for the entire period.

Many relatively mild reactions to penicillin and also to the chalk pills were reported but there were no disastrous toxic effects from the long-continued taking of the penicillin. Neither was there any evidence that the prophylactic doses of penicillin kept it from being effective when it had to be given in remedial doses for illness.

The 730,000 penicillin tablets needed for this large-scale trial, worth over \$100,000 at the minimum prevailing rates at the time, were supplied by the Lederle Laboratory Division of the American Cyanamid Company.

Science News Letter, September 3, 1949

E. FIELDS

ANTHROPOLOGY

New Human Fossil Found In South African Cave

➤ ANOTHER very early human type has been discovered in South Africa, source of many new human and near-human fossils in recent years. This newest find, which is more nearly human than some of the others, was made in the same cave that a short time ago yielded the jaws of a huge ape-man that was given the name *Paranthropus crassidens*.

The new fossil consists only of a lower jawbone, in which five molar teeth are still fixed, with the sockets of other teeth well preserved. It was found by J. T. Robinson, and is reported in the scientific journal, *NATURE* (Aug. 20), published in London, by him, together with Dr. Robert Broom. Both researchers are on the staff of the Transvaal Museum in Pretoria. They have given their new type the name, *Telanthropus capensis*.

The *Telanthropus* jaw is described as of ordinary human size—no larger or more massive than many modern jawbones. The two wisdom-teeth, however, are larger than any known similar modern tooth. While it is primitive in many respects, it is quite definitely human. Nearest resemblance is to the lone, and still puzzling, Heidelberg jaw, found in Germany many years ago. Like Heidelberg Man, *Telanthropus* was rather lacking in chin.

Site of the discovery, and poverty of the adjacent area in datable fossils of other animals, leaves the age of the new type in some doubt. Early pleistocene Ice Age seems likeliest.

Science News Letter, September 3, 1949

PSYCHOLOGY

Approval Necessary To Adolescent

➤ TO the boy of 12 years, the approval of others and having people look up to him is much more important than it is later when he is grown. Despite popular opinion that pictures the young boy as brutally indifferent to the feelings of others, the adult is no more interested in seeing other people happy than is the 12-year-old.

These are conclusions based on a study of the change of interests with age reported by the educational psychologist, Dr. E. L. Thorndike, of New York, to the *JOURNAL OF APPLIED PSYCHOLOGY*. Dr. Thorndike asked 37 graduate students of education to rate themselves on certain interests as they are now at the age of about 30 and as they were at the age of 12.

The boy is more interested in studying things, it was disclosed, the adult more interested in studying people and abstractions.

It is much more important to the boy to be among his own crowd.

Despite the changes with age, the boy's nature at 12 is prophetic of the kind of man he will become. The child to whom approval is more important than being boss is likely to grow up to be a man who seeks applause rather than power.

Science News Letter, September 3, 1949

GENERAL SCIENCE

Now It's HCSB: High Cost Of Scientific Books

➤ ADD HCL problems the cost of scientific books.

They now cost so much that "it is virtually impossible for many scientific workers to own volumes they need and this is to say nothing of the poor student, who has to struggle to pay for texts that are absolutely essential," complains a communication to the journal, *SCIENCE* (April 22).

The protest against book costs by John R. Lowry of General Foods Corporation, Hoboken, N. J., appears in the journal's annual book issue.

"I see no reason for paying \$4.00 for a 147-page book—the price asked for a recent publication," he comments.

Mr. Lowry's solution: use the European procedure of issuing books unbound as well as bound. This would cut the price of many books by a fourth, he contends.

Science News Letter, September 3, 1949

AGRICULTURE-ENTOMOLOGY

If Carrot Seeds Fail, Blame Bad Lygus Bugs

➤ IF LESS than half of your carrot seeds sprout, blame it on the Lygus bugs. Evidence that these inconspicuous, "average-looking", quarter-inch-long insects are to blame for wholesale failure of seeds of the carrot family to germinate and produce new plants is presented in the journal, *SCIENCE* (April 8), by Florence Flemion of the Boyce Thompson Institute for Plant Research in Yonkers, N. Y.

Seed-producing plants of carrot and dill were placed in insect-tight cages, and various kinds of insects were caged with them. The plants with which Lygus bugs were caged produced very high percentages of seed without embryos, hence incapable of sprouting. Those caged with other kinds of insects, but with Lygus bugs excluded, produced full crops of normal seed, complete with embryos.

Although only carrot and dill were used in Miss Flemion's experiments, there is reason to believe that the results hold good for other members of the family as well—parsnip, parsley, caraway, coriander, fennel and several other flavoring herbs.

Science News Letter, September 3, 1949

GENERAL SCIENCE

Truman Asked To Appoint Group To Study Security

➤ PRESIDENT Truman is asked to appoint a commission on science and national security in a letter from 145 scientists published in the journal *SCIENCE* (Aug. 26).

A full investigation is suggested for "excessive attempts at secrecy" that may "diminish instead of preserve our national security."

Other questions that the proposed group of leaders from various fields of science, education, government and business would consider include:

Should secret research be conducted outside military establishments?

What clearances of scientists "admissible within the bounds of scientific and democratic tradition" should be required in military, other government and non-governmental laboratories?

If political tests for non-secret scientific work are required, what effect would there be on the morale of scientists and scientific progress?

The dilemma, the letter says, is that the narrowest interpretation of military security demands that nothing be revealed that might conceivably be useful to a potential enemy, while experience shows that withholding knowledge and abridgment of freedom of thought rapidly inhibit research.

Science News Letter, September 3, 1949

MINERALOGY

Low-Grade Ores Yield Gold By Magnetic Method

➤ GOLD and silver can be pulled out of hitherto unworkable low-grade ores by means of invisible iron handles, in a process on which U. S. patent 2,479,930 has just been granted to Earl C. Herkenhoff and Norman Hedley of Stamford, Conn., assignors to the American Cyanamid Company.

Concentration of practically all precious metals out of their ores begins with getting them into a cyanide solution. This is followed, in the case of high-grade ores, with precipitation on finely divided zinc. With some low-grade ores, finely divided activated carbon is used instead, followed in turn by a flotation treatment. Flotation is troublesome, however, and appreciable losses are entailed.

Messrs. Herkenhoff and Hedley obviate this handicap by rendering their carbon magnetic, either through the incorporation of ground magnetite or by impregnation with an iron salt which is subsequently reduced, leaving pure iron in the pores. After the carbon has adsorbed the dissolved gold, it is separated out by familiar commercial magnetic means. Much larger carbon particles can be used with corresponding reductions in losses.

Science News Letter, September 3, 1949

VETERINARY MEDICINE

World Attack on Animal Ills

International cooperation in fighting animal diseases is saving meat, milk, and eggs for a hungry world. It is also protecting human health.

By DR. FRANK THONE

➤ BECAUSE American stockmen dreaded a cattle plague with a Boer-Dutch name, fewer Chinese peasants will lack rice. Because hens sickened and died in an English town famous since the Middle Ages, there will be more eggs in Argentina.

Because Czech farmers were horrified at the rate they were losing pigs, a new lead toward the conquest of poliomyelitis may be opened up.

Less widely heralded than medical men's researches on the ills that afflict human beings, veterinary research is of vast importance to mankind as well. Animals mean meat and milk, shoes and saddles, and (for all our motor age) a great deal of transportation and farm power. Some of the diseases they have are transferable to man: rabies, anthrax, brucellosis—a whole array of perils to human health. So government departments and international organizations are well advised when they devote much effort and generous funds to the discovery of causes and cures for the ills of animals.

Cattle Plague

Take that cattle plague with the Boer-Dutch name, for example. During the war there was a report that an enemy nation was preparing to initiate biological warfare by launching an infection of rinderpest among our Western cattle herds. In anticipation of this thrust (which was never delivered) our own veterinary researchers made ready their parry, in the form of an effective vaccine.

Rinderpest, translated from its Afrikaans original, means "cattle pest." It is exactly that. It is a deadly disease of all kinds of cattle, including the Asiatic water-buffalo, that kills nine-tenths of all the animals it attacks. It was first known in South Africa, whence its name. Unknown as yet in the Americas, it has been found to exist in practically all parts of Africa and Asia.

It is endemic in Ethiopia and the Sudan, which are great grazing areas and could become great meat-exporting countries, if the curse of this dreaded infection were not on their beeves. The peoples of this huge sector of Africa can become much more prosperous than they are, once practical means for protecting their herds, already available, can be applied.

Rinderpest cuts even closer to the basis of human life in rice-eating China. Few Chinese eat beef or drink milk, yet one kind of cattle are absolutely essential to life in

China. Chinese farmers use buffalo as their plow animals. If a man has a buffalo or can hire one during the planting season, he makes a good crop of rice and his family has food for the year. If the buffalo dies of rinderpest, all the field labor has to be done by hand—and human muscles are simply not adequate for the task. So there is a short crop, with famine afterwards.

Rinderpest outbreaks are frequent in rice-eating China. And where these cattle die, the human population dependent on their slow, patient, grunting toil is not long in following them.

The wartime development of a protective vaccine was a joint project of the United States and Canada, carried on in a carefully isolated laboratory on an island in the St. Lawrence river. The big advance in technique was the growth of the vaccine in incubated eggs, instead of the bulkier, slower, costlier job of producing it in the bodies of animals. At the end of the war, since the vaccine was no longer needed for possible defense purposes, the laboratory was closed down.

However, realizing the immense potential value of the vaccine in lands where rinderpest already existed, the job was taken over first by UNRRA, then by FAO—Food and Agriculture Organization of the United Nations. Their technicians helped the Chinese to produce the vaccine, and in the even more difficult task of inducing the Chinese farmers to bring around their draft cattle to receive this life-saving protection. While the recent course of the civil war in China has interfered with this work, there is no question about its being resumed and pushed further as soon as things become stabilized there.

Protecting Milk

Another example of the great benefits of international cooperation in bettering food supplies through safeguarding the health of cattle is the case of bovine mastitis. This is a "strep" infection of cows' udders, which cuts milk production, shortens animals' lives, and affects human health directly through the causing of certain maladies such as one type of "strep" sore throat. Mastitis is fought not with a vaccine but with penicillin, which is produced in a form suitable for veterinary use. It has been estimated that this treatment is capable of increasing milk production in Europe alone by more



CATTLE PROTECTED AGAINST DISEASE—At a field vaccinating station in China patient, slow-paced plow-buffaloes line up for the "shots" that will protect them from rinderpest.



IMMUNIZING CHICKENS—A Chinese farm wife holds a frightened hen while the veterinarian inoculates it against one of the worst known enemies of chickens, Newcastle disease.

than 5,000,000 tons a year

Foot-and-mouth disease affords still another example of the value of international cooperation in fighting animal ills. Prevalent in Europe and South America, this debilitating infection of cattle was kept off the North American continent until recently, when it became established in central Mexico. Naturally, cattle interests in the United States have become very much alarmed.

Kill-And-Bury Method

When it became evident that the complete kill-and-bury method of suppressing the disease, successfully used against two or three outbreaks on American soil, was not going to work under the quite different conditions obtaining in Mexico, the fighting forces fell back on the vaccination method. This time it is a Swiss vaccine, improved by American and Mexican scientists, that is being injected into the cattle south of the Rio Grande.

Brucellosis is a disease complex that afflicts both domestic animals and human beings, so the international attack on it is being conducted on both the veterinary and the medical fronts. It gets its name from that of the causal germ, known to bacteriologists as *Brucella*. This is an exceedingly small organism, barely visible under the highest powers of the microscope, it is intermediate in size between "regular" bacteria and the microscopically invisible viruses. Among animals, brucellosis is widely known

as contagious abortion, from one of its commonest and costliest manifestations. In human beings, whom it "drags down" but seldom kills, brucellosis is called Malta fever and undulant fever. Brucellosis is being fought in both animals and man with vaccines and antibiotic drugs.

Newcastle disease, so called because it was first detected in Newcastle, England, is one of the worst of known enemies of chickens. It is present in practically all parts of the world, including the United States. Best known weapon against it is a vaccine, American workers have developed a new and reportedly highly effective one, which is being used in other lands by FAO workers.

Swine Disease

One of the strangest yet most encouraging stories of this veterinarians' war for the saving of human lives comes from iron-curtained Czechoslovakia. Pigs were dying by the tens of thousands in the province of Teschen, from an apparently new virus malady. It was accordingly given the name, Teschen disease. Czechoslovakian scientists are working on a preventive virus, but in the meantime the only practical means of checking its spread is ruthless liquidation of all herds of swine in which it appears.

What should interest medical men most, however, is the strange similarity between Teschen disease and human poliomyelitis. Both are virus-caused. Both bring about a

muscular paralysis. Of course, afflicted pigs die, for them there are no iron lungs. But in dying they may be able to give some information about the nature and course of human poliomyelitis, hitherto unobtainable because of the lack of suitable experimental animals on which to conduct tests.

Dr. K. V. L. Kesteven, FAO adviser on animal diseases, believes that if the problem of Teschen disease can be solved, conquest of polio will be speeded. To Czech farmers losing pigs this may be scant consolation. But it may eventually save the lives of many little children.

Science News Letter, September 3, 1949

CHEMISTRY

Gammexane Smoke Found Not So Good for Paper

➤ SMOKE of Gammexane, or benzene hexachloride, one of the more promising of the new synthetic insecticides, isn't good for paper, S. Chakravorti of the research laboratory of the National Archives of India states in the journal, *NATURE* (April 16).

Its use was proposed as a means of getting rid of insects that infest places where valuable papers and books are kept, and that sometimes do a good deal of damage to important records. However, because nothing was known about its effects on the paper itself, Mr. Chakravorti decided it would be wise to make some tests before putting it into general use. It turned out to be a wise precaution.

Two-ounce Gammexane smoke generators were used in closed rooms where paper samples were exposed. After three days the samples were tested, and were found to have lost from one-half to nearly three-fourths of their tensile strength and resistance to breaking on being folded repeatedly.

Some of the samples were artificially aged by heating for three days at boiling temperature. Most of them yellowed, and practically all of them became less resistant to folding. One especially fine all-rag paper, used in repairing ancient manuscripts, and normally able to withstand more than 4,000 foldings before breaking, after the Gammexane-plus-aging treatment, broke the first time it was folded.

Science News Letter, September 3, 1949

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SUFFERN, N. Y.

POPULATION

Fewer Males Predicted

➤ THE sex ratio in the United States population in 1975 will be about 985 males per 1,000 females, statisticians of the Metropolitan Life Insurance Company predict.

This means a slight decrease in males below the 1947 figure when for the first time in our history there were fewer males than females in the population. The ratio then was 992 males per 1,000 females, with men in the armed forces overseas counted in.

The sex ratio at ages 15 to 44 years, however, is expected to reverse its downward trend and eventually will lead to a surplus of males under middle age. This expectation is based on gains in life conservation. At ages under 15, the ratio of boys to girls has increased from 1,022 per 1,000 in 1910 to 1,037 per 1,000 in 1947. This

ratio may increase further as mortality in childhood continues to decline.

At the early years of life, the statisticians point out, there is always a surplus of males because more boys are born than girls. The excess of males is reduced with advance in age because of the higher death rate for males.

This was offset in the United States during the early years of the century by the high influx of immigrants in which men greatly outnumbered the women. In 1910 there were 1,060 males for every 1,000 females in our population, and even as late as 1940 the ratio was 1,007 per 1,000. The ratio will continue to decline at ages 45 and over, the statisticians state, as the foreign-born population with its excess of males passes out of the picture.

Science News Letter, September 3, 1949

MEDICINE

Fluorescent Lights Harm

➤ WORKING near unshielded fluorescent lights can produce a sunburn-like effect on the skin, Dr. R. Ralph Bresler, chairman of the Industrial Health Section of the Philadelphia County Medical Society reported.

This discovery followed the complaint of five women who were employed in a small penicillin filling-room. The skin of their arms and neck not covered by clothing was red, dry and itched. Tests eliminated skin sensitivity to the drug.

Ultraviolet lamps, which were used to sterilize the room, then fell under suspicion but investigation revealed that they were never turned on when the workers were in the room. Further checking at each worker's position showed that even with them turned on the shields were adequate protection.

The ozone emitted by the sterilizing lamps was also measured but found to be within safe limits so that there was no question of an ozone inhalation danger.

Attention was then focused on the ultraviolet lamps which illuminated the filling tables. It was discovered that when these women worked in another room where the filling tables were lighted by ordinary incandescent lamps, the skin inflammation disappeared.

Dr. Bresler, reporting to the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Aug. 27) stated that since the lights were 10 to 14 inches from the workers, and since they were exposed to them for six to eight hours a day, it was entirely possible to get the skin burn found in these patients.

Two other patients had been previously reported as suffering from a skin inflam-

mation when fluorescent lighting had been introduced into their office. These are the only cases on record.

Dr. Bresler pointed out that of three possible remedies, the most practical and safe was found to be the placing of an all-around plate-glass shield around the fluorescent fixtures to absorb the radiation without cutting down the light.

The other two protective measures, replacing fluorescent lighting with incandescent lighting or the using of protective ointments or creams, were found undesirable and impractical.

Science News Letter, September 3, 1949

ENGINEERING

Lightweight Tractor Built for Small Farms

➤ A LIGHTWEIGHT tractor for small acreage farms which is capable of flexing its muscles like a heavyweight when the going gets rough has been developed at England's National Institute of Agricultural Engineering.

The mighty midget was described in a paper submitted by S. J. Wright of the Ford Motor Company, Ltd., Dagenham, England, at a land section meeting of the United Nations Scientific Conference on the Conservation and Utilization of Resources at Lake Success, N. Y. The tractor is a standard two-wheeled machine. Its unique feature is a winch mounted in front with a clutch and chain drive from the engine.

On its ordinary power it performs routine

tasks. When a job requires extra power—for example, deep furrow plowing—the winch attachment takes over. The free end of the cable is anchored at the far end of the field, the winch starts winding, and the tractor hauls itself across the field. When the plow is raised, the tractor runs in reverse gear to its starting point and the operation is repeated. As many as seven or eight furrows may be plowed in this way before the anchorage needs to be reset. The winch carries about 100 yards of cable.

While quite unsuitable for large scale operations such as are required in the middle west or in the areas where large stumps or other heavy obstacles might be encountered, American experts think it might be adapted successfully to certain sections of the United States, especially in the South and East.

Science News Letter, September 3, 1949

RADIO

Voice of America Jammed By 205 Soviet Stations

➤ THE Soviet Union made use of 205 separate jamming stations to keep the radio Voice of America and other foreign broadcasts from reaching its population, the U. S. Department of State says in a recent issue of its monthly Information Sheet. These 205 jamming stations were noted by a British monitoring station in the United Kingdom late in May.

United States Government monitors report that there has been no considerable change in Soviet broadcasting schedules for its own people, indicating that the jamming is carried out by a separate set of high powered transmitters not employed for ordinary programs.

The Voice of America broadcasts had been jammed since February, 1948, but only on a limited and sporadic basis until April 24, 1949. Three agencies of the United States have accurately located the sources of this deliberate interference. All these sources are inside the Soviet Union. Approximately four times the number of transmitters are involved in the Russian jamming as are used by the United States Government in its entire world-wide international broadcasting program.

Jamming is a deliberate radio interference designed to make radio programs unintelligible. One system is to send out from transmitters radio signals of the same identical frequency or wave length as used by the incoming program. Another varies in the frequency of the jamming waves, varying from above to below those of the incoming waves. A third puts on the air "noises" from random frequency modulation.

Science News Letter, September 3, 1949

The so-called *Cleopatra's Needles* from Egypt, one now in England and one in the United States, were quarried from solid granite far up the Nile, some 1,500 years before Cleopatra's time.

NUTRITION

Milk as Sole Life Diet

➤ IT'S possible to support life from birth to death in old age on an exclusive diet of milk

White rats lived to ages comparable to 70 and 90 years in humans with no food other than cow's milk, with a few necessary minerals added

Dr. C. M. McCay of the New York Agricultural Experiment Station gave one group the milk diet and another received rations of cereals, meats, and other normal human foods over a two-year period. There was no apparent difference between the two groups, including length of time lived.

The erroneous idea that milk is food only for the young stems from the observation that young animals change from a milk diet to adult food when they get

their teeth. Actually, says Dr. McCay, "I believe the young stop milk to permit the mother-animal to recover from the long drain upon her body in producing young and to prepare for the next cycle."

Milk is an excellent and nearly complete food at all stages of life, he said. It does lack trace elements, such as manganese, iron, and copper, but these are usually found in the solid food of the adult or can be added to a milk diet. The milk-fed rats in the tests never had any solid foods so never had a chance to chew during their lives.

Dr. McCay concluded from the experiments that "mineralized milk can serve as the sole article of diet from weaning until death in old age."

Science News Letter, September 3, 1949

ENGINEERING

Study Corrosion of Pipes

➤ THE usual cast-iron water pipes seem to resist corrosive action with cold water flowing through them about as well as the more expensive commercial pipes now available, the National Bureau of Standards concludes from a 10-year experiment.

The rapidity with which water pipes corrode, and fail, is important information to the home-owner and the building industry. The replacement of corroded pipe usually is an expensive job, often requiring the rebuilding of walls and flooring.

In the Bureau's investigation, tap water of the Washington system, which has a known analysis, was circulated at constant velocity through a system of eight vertical columns, each made up of 14 specimens of commercial pipe lengths. The specimens consisted of two types of cast iron, three of wrought iron, two of ingot iron and three of open-hearth steel. The amount of inside corrosion was determined by loss of weight and the depth of the pits in the materials.

Every precaution was taken in the investigation to assure reliable results. Except for the metal specimens, the water within the apparatus came in contact only with rubber, glass and stainless steel. Hard rubber rings separated the specimens to prevent metallic contact and galvanic action. The outside of the piping was coated with asphalt varnish to prevent outside corrosion and loss of weight.

Failure of any piping material in actual service usually results from perforation of the wall by pitting. The shallowest pits occurred in the centrifugally cast iron, while the sandcast iron had pits approximately twice as deep. The results of the tests indicate that there is no great difference in the rates of corrosion of most of the wrought iron materials when measured either by loss

of weight or the depth of pitting.

A low-alloy steel had the highest corrosion rate, while a copper-molybdenum ingot iron and a nickel-bearing wrought iron had the lowest rates. Other low-alloy materials such as wrought irons, ingot iron, and ordinary medium carbon steel pipes corroded at intermediate rates. A rough estimate of the minimum life of these bare materials when subject to continuous flow of Washington (D. C.) water would be about 15 years on the basis of the work, the Bureau states.

The tests were made by G. A. Ellinger, L. J. Waldron and S. B. Marzolf of the Bureau staff.

Science News Letter, September 3, 1949

MEDICINE

Arc Welder's Light Can Produce a Sore on Mouth

➤ ATTENTION has been called to a new industrial hazard which produces a sore on the mouth of men coming in contact with arc welder's light by Dr. Sydney Veinon of New Brunswick, N. J.

He suggests that the sore might possibly be a precancerous lesion. His report on two patients appears in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Aug. 27).

One of the patients came in contact with arc welder's light while reading blueprints in a shipyard. His only protection consisted of goggles for the eyes while the welders had hoods protecting their heads. Examination showed a crust on his lower lip which was very pale and thickened. The sore was removed by surgery and the patient recovered without any after-effects.

The other patient had worked on and off in his father's welding shop for some ten years. At one time he had an operation for a "wartlike growth" on the lower lip. He complained of a sore near the same spot when seen by the physician. This was a constant source of irritation and made him bite his lip. The sore dried up with electrolysis but came back, so he was operated on with successful removal of the lesion.

Science News Letter, September 3, 1949

CHEMISTRY

Virginia Hospital Has New Oxygen-Making Plant

➤ THE largest oxygen manufacturing plant in any hospital and only the second of its kind has just been completed by the Medical College of Virginia at Richmond.

Oxygen generated by the new plant is piped to operating and other rooms where it is needed for patients. Top production is estimated at 500,000 cubic feet of oxygen per month, though the hospital averages only 150,000 to 200,000 cubic feet monthly.

Most hospitals obtain oxygen in cylinders, and large savings are expected from use of the new plant.

Memorial Hospital, Hartford, Conn., was the first hospital to install its own oxygen manufacturing unit.

Science News Letter, September 3, 1949

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ZOOLOGY

NATURE RAMBLINGS

by Frank Thone



No Sea-Serpent?

➤ WHAT has become of the Sea-Serpent? Summer has passed, and we stand at the threshold of autumn, yet from no beach resort has come that most hardy perennial of all publicity stunts the sighting (usually at dusk, or in a fog) of a giant serpentine form undulating in coils through the af-

frighted waves. Even the usually dependable Loch Ness monster seems to have gone into retirement.

Perhaps there is a tacit, unvoiced agreement that in these tense and unquiet times any extraneous promotion of mass jitters would be a work of supererogation. Or it may be that the drifting log or other imagination-arousing piece of flotsam is interpreted as a spying submarine instead of a mythical monster.

Romantic-minded persons who like to nurse the sea-serpent myth sometimes argue for a "lost world" in the depths of the ocean instead of on an isolated plateau in the tropical jungle. Why shouldn't some of the long-necked, long-tailed, paddle-limbed marine saurians of fifty or a hundred million years ago not have survived, they ask, safely hidden from prying human eyes save at the rare intervals when they come to the surface?

If these ancient marine reptiles had any physiological resemblance at all to modern members of their tribe, they could not have been dwellers of the depths. All reptiles are air-breathers, hence must get at least their noses above water quite frequently. The

chances are that most of them swam with their heads above water the greater part of the time, submerging only when they were hunting food.

Moreover, all reptiles now living are cold-blooded animals, and it may be safely inferred that these ancient giants were cold-blooded, too. That must have limited their habitat to shoal waters or the warm surface of the open sea. At great depths the ocean water is icy cold, and may be safely invaded from above only by specially adapted warm-blooded animals like the whales. The larger aquatic reptiles, like the crocodilians and the giant sea turtles, habitually stay close to the surface, where they can soak up the warmth they need to remain alive and active.

Unless some unexplored bit of warm, shallow tropic sea can be found where survivors of the Jurassic or Cretaceous reptilian aristocracies may bask and feed and mate, it seems most unlikely that any sober seafarer or beach-comber will ever behold a living plesiosaur or mosasaur. And the South Seas have been rather thoroughly investigated, especially of recent years.

Science News Letter, September 3, 1949

CHEMISTRY-PHYSICS

No Long-Lived Astatine

➤ HOPE of finding a long-lived variety of the new radioactive element astatine has faded.

This news has been reported to scientists in the JOURNAL OF CHEMICAL PHYSICS by a team of University of California chemists, Drs. G. L. Johnson, R. F. Leininger and Emilio Segre.

Their scientific search was for a long-lived isotope of the element, No. 85 on the chemists' list. They discovered two previously unknown isotopes of astatine, but they did not find one with much life-expectancy. Their longest-lived one has a half-life of only a little more than eight hours. In all, seven varieties of astatine are now known.

In their researches, the University of California scientists had to use invisible amounts of astatine, because its short life prevents stockpiling. They got their samples of the element which does not occur in nature by bombarding bismuth with alpha particles in the 60-inch cyclotron at the Crocker Radiation Laboratory.

Like its close chemical relative, iodine, the new element dissolves in organic liquids. Carbon tetrachloride, the familiar cleaning fluid and fire extinguisher, was used to dissolve the minute amount of the element.

Although never seen by man, astatine is known to be more like a metal than the other members of its chemical family. Besides iodine, they are chlorine, widely used as disinfectant and bleach, bromine, whose salts are used in photography, and fluorine, the exceedingly active gas whose large-scale

production was a by-product of the wartime work on the atomic bomb.

Science News Letter, September 3, 1949

BIOCHEMISTRY

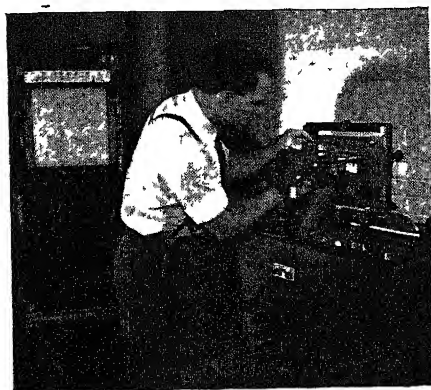
Cobalt Is Beneficial To Cattle and Sheep

➤ COBALT, a trace element needed by sheep and cattle, helps them indirectly by helping certain beneficial bacteria that live in their digestive tracts. Strong evidence to this effect has been produced in experiments reported in SCIENCE (May 6), by Dr. Lorraine S. Gall and associates, working at Cornell University and the Ohio Experiment Station.

Four groups of sheep were used in the experiments. The first was kept on a cobalt-deficient diet and given no cobalt. The second received the deficient diet and cobalt injections into their veins. The third group got the same diet, plus cobalt by mouth. The fourth group received a normal diet (containing cobalt) but was kept on short rations. Samples from the rumen, or cud-pouch, in the first two groups contained only half as many bacteria as those from the last two, where cobalt was taken in with the feed. There were marked differences also in the bacterial forms present in the two sub-groups.

Associated with Dr. Gall in the research were Drs. S. E. Smith, D. E. Becker, C. N. Stark and J. K. Loosli.

Science News Letter, September 3, 1949



Lab saves research time

Rensselaer Polytechnic Institute uses the L&N Knorr-Albers microphotometer for metallurgical research. The instrument automatically scans spectrographic plates and draws a record of the results on a chart. This means the technician obtains a faster, more accurate spectrographic analysis, with less effort on his part.

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Books of the Week

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BRITISH AGRICULTURAL BULLETIN, Vol I, No 3—*British Council*, 152 p, illus, paper, 5 shillings (\$1.00) Published quarterly and contains articles on leading subjects For the Agricultural Scientist and the well-informed layman

CAN LABOR AND MANAGEMENT WORK TOGETHER?—Osgood Nichols and T R Carskadon—*Public Affairs Committee*, 32 p, illus, paper, 20 cents Pamphlet No 151 is a brief discussion of this foremost problem

GOETHE AND PHARMACY—George Urdang—*American Institute of the History of Pharmacy*, 76 p, illus, paper, \$2.50 The institute's contribution to the 200th anniversary of the birth of the great poet and naturalist by the director of the institute Traces the great poet's interest in pharmacy from the time of his early training in that science to late life

GROUP MEDICINE & HEALTH INSURANCE IN ACTION—Robert E. Rothenberg, and Karl Pickard—*Crown*, 278 p, illus, \$5.00 An account of actual experience in prepaid medicine and group medical practice, this book depicts the experience of a group of doctors who have been serving more than 14,000 people for two years

THE HARVARD LIST OF BOOKS IN PSYCHOLOGY—Gordon W. Allport and others—*Harvard University Press*, 77 p, paper, \$1.00 A list of 612 books which the members of the instructing staffs of the Departments of Psychology and Social Relations in Harvard consider important and valuable

JORDAN-BURROWS TEXTBOOK OF BACTERIOLOGY—William Burrows—*Saunders*, 15th ed, 981 p, illus, \$9.00 Revised and partially rewritten

THE MAPLETON METEORITE—Sharat Kumar Roy—*Field Museum of Natural History*, 10 p, illus, paper, 40 cents A general account of an iron meteorite found in a corn field in Mapleton, Iowa

THE MIRACLE DRUGS—Boris Sokoloff—*Ziff-Davis*, 308 p, illus, \$3.00 This book tells of the background to the new antibiotics and sulfonamides, among which are penicillin, streptomycin, neomycin, patulin and aureomycin, and gives the layman information on what the new drugs will do so far as scientists know today

A NEW ANT-THRUSH FROM BRITISH GUIANA—Emmet R. Blake—*Chicago Natural History Museum*, 2 p, paper, ten cents

ORGANIZATION OF THE AMERICAN EXPEDITIONARY FORCES—Vol I United States Army in the World War 1917-1919—Historical Division of the Department of the Army—*Gov't Printing Office*, 426 p, illus, \$3.00 The first of a

series of volumes to present a widely representative selection of the records believed to be essential to a critical study of the history of that war

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THE USE OF "KIRKSITE" FOR METAL FORMING—John L. Young—*Mellon Institute*, 4 p, illus, paper, free upon request to Mellon Institute of Industrial Research, University of Pittsburgh, Pittsburgh 13, Pa

THE VERTEBRATE BODY—Alfred Sherwood Romer—*Saunders*, 643 p, illus, \$5.50 A college text with considerable paleontological background

THE WORLD AS I SEE IT—Albert Einstein—*Philosophical Library*, Abridged Ed, 112 p, \$2.75 A republication of Dr. Einstein's first general book Excerpts are compiled of his articles, addresses, and pronouncements to show his thoughts on life, the world about him, and on his scientific labors

Science News Letter, September 3, 1949

PSYCHOLOGY

Dogs Broadcast Reactions By Way of Radio Signals

➤ DOGS not only signal by wagging their tails at Jackson Laboratory but they broadcast to a scientific radio receiver their brain waves, blood pressure and other emotional reflexes.

The canine assistants to the scientists in Bar Harbor, Maine, wear a light-weight harness carrying a little telemetering instrument that broadcasts by low-powered shortwave radio the signals that are picked up by a special receiver that writes a record

When the dog is made angry or afraid by meeting another dog or an unusual situation, the effects that this emotion produces can be investigated without tangling the animal in a maze of wires as older devices required The animal, except for the radio pack he carries without trouble, is just as free and unencumbered as he would be frisking about at home

Part of a program on animal psychology that is expected to help to throw light on why humans act the way they do, the new brain wave telemetering is being developed under the direction of Dr. J. P. Scott

Science News Letter, September 3, 1949

Words in Science—SEED-SPORE

➤ SEEDS and spores both hold the promise of the coming generation of plant life, but they are quite different

A seed contains within its hard coat the young embryo and material to support its life during the early days It is formed by pollen and female plant organ in sexual union Even the smallest seed contains many thousands of cells

A spore contains no embryo It is a single cell, formed by the cell division of a mother spore cell, which is capable of development into a new individual It is usually asexual Ferns, mosses, fungi and algae are among the plants reproduced through spores, not seeds

Science News Letter, September 3, 1949

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⚙️ **SILICA COATING** for the insides of incandescent electric light bulbs improves appearance and reduces glare without sacrificing light output. Very fine silica is used and it is applied by a special process.

Science News Letter, September 3, 1949

⚙️ **CONVEYOR** for loading and unloading trucks, and for the handling of packages within a shop, is made in 10-foot sections of aluminum or magnesium with rollers of a long-wearing plastic. The 10-foot sections which have a load capacity of 500 pounds, weigh only 31 pounds. Sections can be hooked together in a series.

Science News Letter, September 3, 1949

⚙️ **RIBBON SOLDER**, containing its own flux, is the width and thickness of ordinary binding tape and is featured by its low melting point. Heat can be applied to a bit of the material at a point to be soldered either with a common match or a soldering iron, resulting in a neat and strong joint.

Science News Letter, September 3, 1949

⚙️ **SAFETY POURING** spout, for use with five-pint acid bottles or one-gallon jugs, has an ingenious design which vents air into the container as the liquid is poured out, thus eliminating splashing, spilling, and "after-



drip." It is a simple device, as shown in the picture, and is made of a plastic resistant to most chemicals.

Science News Letter, September 3, 1949

⚙️ **ANTI-FRAY** liquid, easily applied to frayable fabrics by brush before cutting, has an advantage over earlier preparations for the same purpose in that it is non-inflam-

mable in the dried state, is fast-drying and neutral in color.

Science News Letter, September 3, 1949

⚙️ **TURN-TABLE** for any table television set, which permits viewing from any position without shifting the furniture or lifting the receiver, glides on nickel-plated ball bearings and allows even heavy sets to be turned easily. The steel turn-table ring has a base of wood and felt that protects any table surface from damage.

Science News Letter, September 3, 1949

⚙️ **RADIATION COUNTER**, for use in the nuclear field and in measuring radioactivity, combines the functions of a scaling unit, a radiation survey meter, a count rate meter and a contamination detector. The 24-pound portable instrument is about 12 by 10 by 8.5 inches in size.

Science News Letter, September 3, 1949

⚙️ **MAPS** that graphically simulate the colors and contours of the earth as the terrain appears from high altitudes are now provided for passengers by one of the trans-continental airline companies. With them the traveling public can identify all major landmarks below.

Science News Letter, September 3, 1949

Do You Know?

The average person, it is said, breathes in a pint of water a day.

More than 4,500,000,000 pounds of fish were brought into United States ports during 1948.

Artificial heating is required about eight months each year for a large percentage of the homes in the United States and Canada.

Plastic films that can be peeled off easily have been found useful as a primary barrier to protect permanent coatings and base materials from radioactivity.

The daily requirement of the average normal man is 35 pounds of food, four pounds of water and 34 pounds of air, a scientist recently stated.

Of the three principal components of food, carbohydrates are abundant, fats, while not present in large quantities, are still fairly plentiful, but the supply of protein is strictly limited.

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See Page 164

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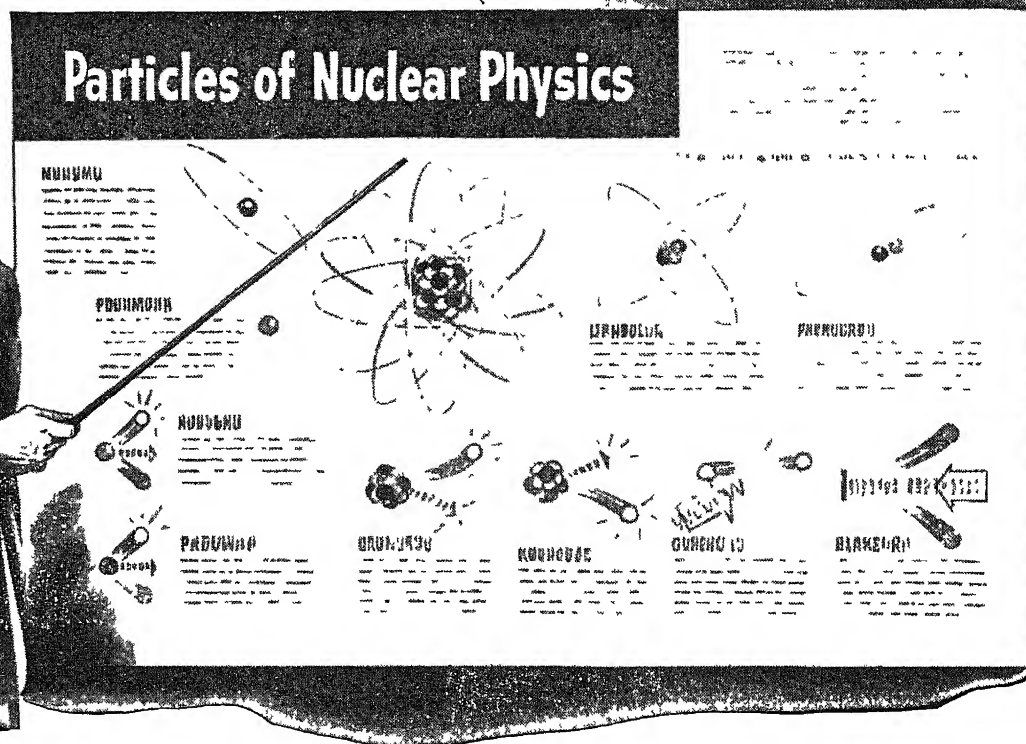
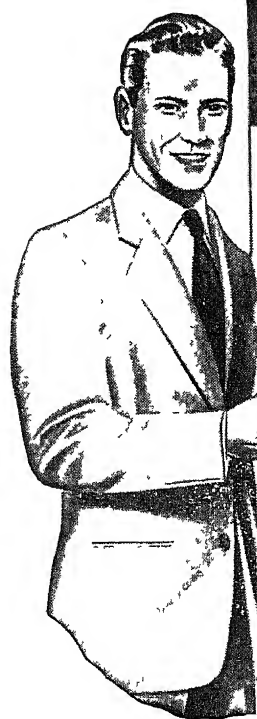
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PHYSICS-CHEMISTRY

New Super Microscope

A British scientist has constructed a reflecting microscope which "sees" the living chemistry of cells with mirrors and the invisible light of infra-red rays.

➤ A SUPER microscope that "sees" the chemistry of living things, hailed as a "revolutionary" advance with applications so vast they may not be "fully explored in our lifetime," was reported to the British Association for the Advancement of Science, meeting in Newcastle, England.

This super microscope, called the reflecting microscope because it "sees" with mirrors instead of lenses, was constructed by Dr. C. R. Burch of Bristol, England. Research with it in fields ranging from cancer-fighting to manufacture of synthetic fabrics like nylon was reported by Dr. Robert Barer of Oxford University.

Exciting feature of the new microscope to scientists is that with it they can use the invisible light of infra-red rays for spectral analysis and identification of chemicals. The infra-red absorption spectrum of a chemical compound is so characteristic that chemists often call it the "fingerprint of the molecule."

With the new reflecting microscope they can now detect the presence of a chemical, such as penicillin or a vitamin or a cancer-causer, inside a living cell by its spectral "fingerprint." In addition they can find what part of the cell it is in, and how it may be changed structurally by other chemicals in the cell.

Fibers of muscles and nerves and also of fabrics, such as terylene, the English nylon-like material, are being studied with this new microscope. Changes are being detected in the fiber chemicals, according to whether the fiber is stretched or unstretched.

The structures of a minute crystal of a mold chemical related to penicillin and of a crystal of the anti-pernicious anemia vitamin B₁₂ are showing themselves through spectral analysis of their mirror-magnified images.

Instead of lenses, such as ordinary refracting microscopes have, the reflecting microscope made by Dr. Burch is equipped with a small spherical convex mirror and a large aspherical concave mirror to do the magnifying job. The mirrors are made of speculum metal coated with a very thin reflecting layer of aluminum. Reflecting microscopes have been made in several countries but some of them are equipped with lenses as well as mirrors and some do not have aspherical mirrors.

The clearance between the object to be viewed and the small mirror of the Burch microscope is about an inch and a half, or some 13 times the working distance on a lens microscope with a similar numerical aperture. This makes for much easier

manipulation and permits examination and dissection under high magnification of organs such as the liver, spleen, kidney and brain of a living anesthetized animal.

Microscopes, however, are no longer regarded as merely super magnifying glasses, Dr. Barer pointed out.

"Indeed, with the reflecting microscope we may not always want to look at the ordinary appearance of the object at all," he declared.

"It is quite possible that in future work with this instrument we may be content to learn about the chemistry of the object by observing the behavior of a spot of light on a cathode-ray tube screen. This is indeed a far cry from the careful visual observation of preserved and stained specimens on which so much knowledge of cell structure is based."

No reflecting microscopes have yet been

built in the United States, so far as is known. Scientists at the National Bureau of Standards, however, are enthusiastic about the possibilities of "seeing" new things with this type microscope and foresee a "rush of energetic research workers" into the field.

Science News Letter, September 10, 1949

AGRICULTURE

Cucumber Grafts on Squash Grow Faster, Double Yield

➤ CUCUMBER vines grafted on squash vines grew much faster than did cucumber vines growing on their own roots. The yield of cucumbers from grafted vines was doubled.

These results of a number of field experiments are announced by Drs. Dontcho Kostoff and Manol Stoyloff, of the Bulgarian Academy of Sciences.

Primary objective of the experiments was to find a way to grow cucumbers without irrigation. The squash vines, with their stouter growth and deeper-thrusting roots, were able to tap moisture levels in the soil which the weaker roots of cucumber vines could not reach.

Science News Letter, September 10, 1949



WILD BLACK EYED SUSAN CULTIVATED—The yellow daisy held by Dr. Albert F. Blakeslee, director of the Genetic Experiment Station at Smith College, measures seven inches across. Research assistant, Mary Alton of Burlington, Ontario, holds in her left hand one of the wild field flowers for comparison. In her right hand is the double daisy, a globe of yellow petals, developed from the same wild flower. These specimens were developed by treating the yellow daisy with colchicine which doubles the chromosomes and tends to enlarge the flower's size and deepen its color. Selection and cross-breeding have resulted in several new garden varieties.

AERONAUTICS

Refueling in Mid-Air

➤ REFUELING long-range planes in mid-air may become a relatively common practice, it was predicted recently by Sir Alan J. Cobham of England, managing director of Flight Refuelling, Ltd.

Advantages include elimination of the necessity of making stops between terminals to take on gasoline, decreasing the time required for long flights, and the ability to carry heavier payloads due to the saving in weight from lesser loads of fuel.

Refueling in mid-air is not a new procedure. American stunt flyers during the past two decades have remained in the air for weeks at a time by mid-air refueling. The equipment used, however, was somewhat crude. The British company represented by Sir Alan has approached the problem from a scientific viewpoint, and during the past 15 years has succeeded in developing equipment that makes mid-air refueling more practical.

It was this British company that supplied the equipment for refueling the U. S. Air Force bombers that took part in the recent round-the-world-non-stop flight, and also the more recent achievement of an English jet-fighter which remained in the air for 12 hours.

Flight-refueling systems are safe, simple, reliable and inexpensive, according to Sir Alan. The equipment on the plane to be refueled consists of fuel lines built into the airframe and usually leading to a single intake. Automatic valves at each tank permit the selective filling of individual tanks or any number of tanks.

The pilot of an airliner equipped for mid-air refueling merely flies on a straight and steady course, the aviation scientist explained. The flight engineer presses a button which lets out a "drogue" or specially equipped fuel line from the tail of the plane. A tanker approaches from the

rear and, with an automatic probe, makes the fueling connection. The tanks are filled automatically and the engineer presses another button which retracts the drogue.

Fuel is transferred under pressure at rates up to 300 gallons a minute, but, due to the closed system, no leakage occurs at any time during the operation. The British system is now available to Flight Refueling, Inc., Danbury, Conn.

Science News Letter, September 10, 1949

On This Week's Cover

➤ THE crafty crab spider captures its prey in its long, powerful front legs, concealing itself in flowers and leaves and lying in wait for its victims.

This spider has the ability to change its color so that it will blend with the color of its surroundings. Generally its color ranges from white to yellow, and it has a few darker markings on its body to help camouflage it.

It's called a crab spider because it runs sideways like a crab when it is disturbed. When it is pulled from its hiding place, it will hang on by spinning a fine line of beautiful silk that glistens in the sunlight.

Science News Letter, September 10, 1949

GENERAL SCIENCE

Elect FIDO Developer Head Of British Science Group

➤ A SCIENTIST who helped develop the fog-fighting system that saved the lives of countless American fliers during World War II has just been elected to one of the highest positions in British science.

The new president of the British Association for the Advancement of Science, Brig Gen Sir Harold Hartley, served as a scientific adviser to the Petroleum Warfare Department and was concerned with the development of FIDO (fog, intensive dispersal of), which used controlled fires to clear the fog over landing fields. This system was used on American and British airports in England during the war to clear landing fields for returning fliers. It is now experimentally in use at some American airports.

Science News Letter, September 10, 1949

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POPULATION

Population Needs Curbing

If Eastern countries would restrain their high birth rate to the pace set by the Western world, there would be no danger of starving for the world.

➤ THE world will not starve due to inadequate food production if population increases as it does in Western countries, Sir John Russell, leading agricultural expert and director of famed Rothamsted experimental station, told the British Association for the Advancement of Science at Newcastle, England, in his presidential address.

But the world's food can easily be outstripped locally if the high birth rates of Eastern countries prevail, he warned. If standards of living such as in the United States, Europe and other western areas are desired, the rest of the world must adopt population restraints, such as birth control, he intimated.

Great increases in food production have resulted from the application of science to agriculture, Sir John told his fellow scientists. Whereas a food producer can feed four to five people under the old system of agriculture, modern methods can feed about 15 to 20 persons per farmer, provided the industrial civilization gives him the mechanized tools with which the up-to-date farmer can work.

There are on the average only about one and one-half acres of land per person in the world used to produce food, whereas there exist about five acres per head that might be used so far as climate is concerned. One great problem is to bring the unused three and one-half acres under cultivation.

"The limit to the world's food production at any time is set by the efficiency of the plant as a transformer of radiant energy," he said. "At present this does not exceed 5% and, reckoned on the basis of the amount of food produced, it is much less. Whether this can ever be raised, whether we can ever do more than increase the proportion of assimilation products useful as food, cannot be said. But the present limitations to food production utilization of 7% to 10% only of the earth's surface, conversion by the animal of 10% to 25% only of its food into human food, and fixation by the plant of no more than 5% of the radiant energy it receives. These are all challenges to agricultural science—which its workers are vigorously taking up."

Sir John warned that food will not be produced in the world merely as a sense of duty.

"If more food is needed, more work must be done," he said. "Food producers will labor to obtain a surplus for the outside world only on a condition that they are provided with adequate appliances and

incentives. The replacement of craftsmanship by mechanization is inducing in agriculture, as in industry, a flight from labor. In many cases now the problem is not so much to increase output as to maintain markets and reduce hours of work. Happily, in spite of modern tendencies, a strong sense of individual responsibility in regard to hungry peoples still survives among food producers."

Great as are the powers of science, he warned, they are of only limited help in the case of human problems, such as population control. "Science can do much to overcome material difficulties and, better still, to satisfy man's thirst for knowledge of the universe in which he lives," he said. "It can insist continuously on our high duty to seek out the truth fearlessly and honestly, and having found what we believe to be the truth, to proclaim it—but in all humility, and recognizing that we may be wrong. Apart from that, science can give little guidance in those great moral and spiritual problems which lie at the root of our most serious troubles today. It opens up many possible ways of life

but gives no help in choosing which to follow. It deals with the facts of existence but not with the values of existence. It gives some light to them that sit in darkness, but it has little consolation for those in the shadow of death and it does not guide our feet into the way of peace."

"Even if science should make large scale fighting wars impossible it can do little against the more subtle wars by infiltration. It offers us great possessions but as the old aristocracy knew, great possessions imply great personal responsibilities. Democracies still have this to learn."

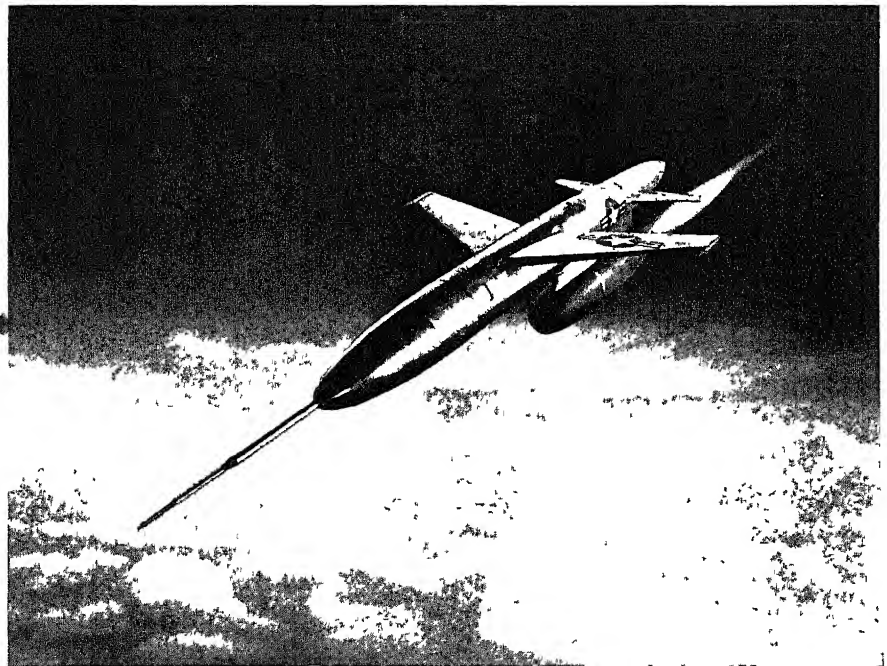
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AERONAUTICS

Navy Gunners' Skill Against Fast Target to be Tested

➤ THE effectiveness of Navy anti-aircraft gunners in bringing to earth pilotless, radio-controlled targets, traveling at speeds well up to that of sound, is to be tested soon. The speedy target will be the Navy's plane-like, ram-jet powered KDM-1, built by the Glenn L. Martin Company of Baltimore.

This Martin KDM-1 ultra-high-speed target drone resembles the ordinary jet-propeller fighter with a lance-like projection from its nose, but is smaller. It has swept-back wings and a horizontal tailpiece. Its engine, however, is to the rear and under the bomb-shaped body. It is the ram-jet type, unable to operate until its carrier has a speed of some 300 miles an hour and the engine can gather in enough air to cause



SPEEDY TARGET DRONES—These will be used by the Navy to simulate maneuvers of the fastest fighter planes in order to sharpen the eyes of the anti-aircraft gunners of the surface fleet.

proper combustion

To get the drone into the air and give it sufficient speed to permit the engine to operate, another plane is used. At proper speed and altitude, the KDM-1 is fired and released. From that point on, the target is on its own except for the radio-controls, operated at will from the earth below.

Upon exhaustion of its fuel, the KDM-1 noses up sharply, a parachute is released and the target drops gently into the water over which it has been flying. Experience shows that any damage that may occur is only slight, and the target drone can be readily made available for another flight.

Science News Letter, September 10, 1949

MINERALOGY

Air Is Mined for Millions In Precious Metals

➤ THE air is being mined for a million dollars and more worth of gold, silver and other metals.

A Los Angeles chemist, Walter A. Schmidt, told how it's done at the United Nations Scientific Conference on the Conservation and Utilization of Resources at Lake Success, N. Y.

Valuable quantities of minerals, precious and otherwise, are released into the air as industrial wastes, Mr. Schmidt explained. Smoke from improvident factories may be worth a fortune, he stated.

Industrial plants which have taken measures to recover these minerals have been well repaid.

Here are some of the findings reported by the chemist:

"One smelter recovers more than \$1,000,000 a year in gold, silver and copper out of the gases from 12 multiple-hearth roasters.

"One mint recovers more than \$100 a year in gold and silver from the gases ventilating its refining furnaces.

"One lead smelter recovers more than \$300 a year in lead and silver out of the gases from 10 sintering machines."

Science News Letter, September 10, 1949

GENERAL SCIENCE

English Is Most Popular Scientific Language

➤ ENGLISH is now the most widely used language for scientific articles, pushing German and French into the background.

More than half, 57%, of all scientific articles are now published in English, Fletcher S. Boig, professor of chemistry at Northeastern University, Boston, Mass., found in a survey of scientific periodicals and articles.

Russian, which was of slight importance as a scientific language 20 years ago, now follows French and German as an important language of science.

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U. N. SCIENTIFIC CONFERENCE—Carter Goodrich (center), professor of economics at Columbia University, New York, and programme director of UNSCCUR, discusses programme with, left to right: Antoine Goldet, director of the U. N. Department of Economic Affairs; S. S. Bhatnagar, secretary to the Government of India, Department of Scientific Research; Fairfield Osborn, president of New York Zoological Society; and Colin G. Clark, director of the Australian Bureau of Industry.

CHEMISTRY

Fertilizer from Dead Sea

➤ THE Book of Moses and modern technology have joined forces to extract "inexhaustible" quantities of fertility from the Dead Sea, resource experts were told at Lake Success, N. Y.

An Israeli potash company is using aerial photography and solar energy to realize potentialities hinted at in the parable of Lot's wife. The curiosity that proved so fatal to that ancient lady is being coupled with the chemical ingenuity of Israeli's chemists to produce large quantities of three other elements in addition to pillars of table salt.

The most important of these is potash which is used as a fertilizer. According to Dr. M. R. Bloch of the Palestine Potash Company "the Dead Sea contains some 2,000,000,000 tons of potash and is a practically inexhaustible source of salt, magnesium, and bromine."

The biblical link was made by Dr. Bloch at a mineral section meeting of the United Nations Scientific Conference on the Conservation and Utilization of Resources. "I believe that chapters 14 to 21 of the first book of Moses should be reread in the light of modern experience," he said. "It is possible that the passage describes happenings in the vicinity of an important salt-supply

center for a Babylonian empire."

This biblical area has been carefully mapped from the air. The survey showed two natural formations where the Dead Sea brine is evaporated as if in a huge shallow dishpan. Using specially constructed pans to "harvest" the minerals left after the heat of the sun has evaporated the water content, the chemists then refine out the potash, salt, and the other components. By these techniques, vast quantities of fertilizer and valued minerals will be extracted from the Dead Sea. Vast enough, Dr. Bloch thinks, "to sustain a considerable advance in the standard of life in the world."

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Much of the *horsehair* used in stuffing furniture comes from the manes and tails of wild horses in Argentina, after the hair gets to America it is curled by a laborious hand process.

Much *commercial fish* is now filleted and skinned by machinery, reducing the labor involved in fish processing, all parts of the fish not reaching the human market find their way into animal feed or fertilizer.

PSYCHOLOGY

Rituals Help Hold Family

The ceremonies which become a part of family life increase its happiness. They are most common among better-to-do families.

► **FAMILY** rituals—those little acts that the whole family get together and take part in every day, every week or once a year—are important in holding the family together and increasing its happiness. This is the conclusion of Drs. James H. S. Bossard and Eleanor S. Boll, of the William T. Carter Foundation, University of Pennsylvania, from a study of some 400 cases.

Not every family has its own private ceremonies, they found, but those that do sometimes observe them very faithfully and they are of a great variety.

In one family there is a reading of the poem, "The Night Before Christmas," every year on Christmas Eve. The ceremony has become more and more elaborate with the passing years. Lights are extinguished and candles lighted. Refreshments are served. No one of the family would ever miss the occasion.

In another family, a ritual is made of the washing of hair on Thursday evening.

One father makes a ceremony of taking

home a package of gifts of candy, fruit, and so on to the family each Saturday.

Some make a ritual of listening to certain programs on the radio each week.

One interesting ritual is reported thus:

"I was in my last year in High School when the depression came. Our family was hit by it. I succeeded in getting a summer job to help out. The first Saturday I worked, Daddy and I came home at about the same time (10 o'clock) in the evening. I remember that I fried some eggs and made some coffee for us that night. While we ate, we talked about our experiences at work, then we put our weekly wages on the table and, with mother coming in, we planned our expenditures for the week ahead. Thus began a practice which has continued at our house ever since. Every Saturday night, we meet in the kitchen of our home at 10 o'clock. Eggs are fried, and coffee or cocoa is served. Then we talk—about our work, experiences of the past week, the family income, our plan

for family expenditures, and other matters of family importance. Often these family sessions last until after one o'clock. Six years ago, I was married, but my husband and I have kept our weekly date with mother and dad. None of us ever let anything interfere with these Saturday night get-togethers. They surely have become a ritual in the life of our families."

The study included 156 families from lower, middle, and upper class, selected from among patrons of a social settlement, a public school in a middle-class suburban district and the Junior League and Social Register.

Family rituals increase in number, variety, richness and willing cooperation by individual family members as one moves upward in the social scale, it was found.

"The lower class is one in which there is little connection with the past," the investigators observed. "The present is composed of individuals crowded into a space too small for comfort. The religion is predominantly Catholic. The economic situation is not one of affluence. Children see little of anything in their families to stimulate a desire to perpetuate what they see. Opportunities for emotional satisfactions in the home are few, even for the adults. The rituals arising from these situations are, for the most part, rituals of expediency, to keep the home going, and to facilitate escape from home into a more exciting or promising outside world."

The middle class is more comfortably situated. There is enough physical space to permit of frequent family get-togethers.

The upper class is guarding a way of life which is considered by them, and many others, to be the desirable way of life. They have the time, for the most part the wealth, and the physical surroundings in which they can perpetuate it. Rituals in this upper class group are more formalized and are more easily handed on from one generation to the next than in the other classes.

A complicating factor is the fact that large families, it was observed, tend to encourage rituals more than small families. And large families are found near the bottom of the economic scale, where the scale of living tends to hamper the tendency.

The study is reported in the *AMERICAN SOCIOLOGICAL REVIEW*.

Science News Letter, September 10, 1949



FISHERIES EXPERTS IN INFORMAL DISCUSSION—This group of experts on fisheries got together between meetings of UNSCCUR. They are, left to right: Lionel A. Walford, U. S., chief, Branch of Fishery Biology, Fish & Wildlife Service; Andrew Lyle Pritchard, Canada, director of Fish Culture Development, Department of Fisheries, Michael Graham, United Kingdom, director of Fishery Research, Ministry of Agriculture and Fisheries; M. Goldschmidt, U. N. Secretariat; Sunder Lal Hora, India, director of Zoological Survey; Ahmad Nazir, of Pakistan, and C. J. Botteman of The Netherlands.

PSYCHOLOGY

Those Who Learn Fast Can Remember More

► **THOSE** who learn faster also remember more, Dr. George H. Zimny, of Loyola University, reported to the American Psychological Association in Denver, Colo., as a result of tests of speed of learning and amount retained conducted on 56 students.

The material learned was 15 meaningful but logically unconnected four-letter nouns.

Science News Letter, September 10, 1949

GENERAL SCIENCE

Very Few Pennies Saved by Buying Paper Bound Books

► **BUYING** a book without the heavy cover would only save you a few cents, a publishing official states

F Ronald Mansbridge of the American branch of the Cambridge University Press says that there would be little saving to you if you could buy regular editions of books with only paper covers. Mr. Mansbridge's views are given in the journal, *SCIENCE* (Aug 5), in answer to an American scientist's complaint about the high cost of scientific books.

John R. Lowry of General Foods Corporation, Hoboken, N. J., wrote to the journal suggesting that paper-covered books might help cut the cost (*See SNL*, Sept 3 p. 153).

"The saving in most instances would amount to only a few cents," declares Mr. Mansbridge. This, he explains, is because most of the job of binding a book has to be done regardless of the type of cover.

As for the price of books, Mr. Mansbridge has some further comments. Book prices are up, but they haven't doubled, and the cost of manufacturing books has in recent years

"I believe that books show a smaller increase in price over the prices of ten years ago than almost any other commodity on the market," he concluded.

Science News Letter, September 10, 1949

ASTRONOMY

Fourth New Comet of 1949 Has Been Spotted

► **A NEW** comet, fourth of the year and second one to the credit of South African astronomer E. L. Johnson, was discovered Aug. 24.

Far too faint to be seen by the naked eye and too far south in the sky for many American telescopes, the new comet was spotted by Mr. Johnson from the Union Observatory at Johannesburg. First new comet of 1949 was also discovered by Mr. Johnson in May.

Of fourteenth magnitude, the comet was first spotted in the southern constellation of Capricornus, the horned goat. It was moving south and west in the sky and is now believed to be in the constellation of Microscopium, the microscope.

Science News Letter, September 10, 1949

GEOLOGY

Mexico's New "Volcano" Has Several Possibilities

► **THE** shepherd who was treated in Mexico for burns said to have come from a new volcano rising out of the earth southeast of Mexico City may have been the discoverer of volcanic Mexico's newest

erupting mountain. But there are several possibilities.

One is that he was too familiar with the story of Dionisio Pulido, a Mexican farmer whose corn field sprouted the now-famed Paricutin volcano only six years ago.

Only about two years ago, reports came of another "Paricutin," this one in Vera Cruz state. The "volcano" was a fumarole, a hole from which gases or fumes issue. And the reports, which momentarily excited earth scientists, were merely designed to get publicity and attract tourists.

But Mexico will, scientists believe, have other "corn field volcanoes" rising out of the earth as dramatically as Paricutin. One authority, Dr. Fred M. Bullard of the University of Texas, has traced the development of Mexico's volcanoes and says there will be more. But his theory puts the appearance of the next one along about two centuries from now.

Science News Letter, September 10, 1949

AGRICULTURE

Irrigation by Sprinkler System Best on Sandy Land

► **THE** sprinkler system for irrigating farm crops and orchards is often preferable to the ordinary ditch irrigation where it is necessary to save water, particularly on sandy or steeply sloping lands in cultivated crops.

This is one conclusion in a report of the U. S. Bureau of Reclamation on sprinkler irrigation. Copies may be obtained from the U. S. Government Printing Office. It is a comprehensive report, covering present sprinkler systems in use, particularly in the Northwest and in Texas.

The sprinkler system applies water from overhead from perforated pipes, or from rotary sprinklers much like those long used on lawns. Its application to commercial crops has been rapidly increasing during the past decade or so. Its advantage is that the water is applied evenly over the entire surface, gradually sinking into the soil to the depths required to be available to plant roots.

In ordinary commercial irrigation, water is distributed to the fields where needed by open ditches, and then permitted to flow between crop rows usually at right angles to the ditch. Soils near the ditch absorb an oversupply of water, while soil farther away may get too little. Much water also is lost by sinking deep in the soil where it is of little immediate value to ordinary crops.

The sprinkler system brings into irrigated crop production land where the ditch system can not be used because of terrain. Also no land is utilized for ditches, being therefore available for crops. The report points out economic problems that must be taken into consideration in determining which system to use. On land where either could be used, cost is the principal factor.

Science News Letter, September 10, 1949



GENERAL SCIENCE

Plan Science Organization For Marshall-Aided Areas

► **BEGINNING** steps have been taken toward a scientific research organization for backing up the economic cooperation of Western European countries.

Technological investigations, upon developments in coal, peat, tide power, wind power, and other large and wide-spread industrial applications of science are planned.

Organized under the chairmanship of Dr. Alexander King of the British government science office in London, the technical cooperation working party is a part of the OEEC, the organization for European economic cooperation of the Western European countries aided by the Marshall Plan.

The first actual international investigation is already underway in Holland, where a blast furnace is being devoted to a study of the luminosity of flames in the furnace in which oxygen-enriched blast is being used. British, Swedish and French engineers are working with Dutch specialists and facilities in this case.

Making liquid fuel out of coal and gas out of peat are high on the list of projects planned for inquiry.

Science News Letter, September 10, 1949

ASTRONOMY

Second Largest Telescope Ahead of Schedule

► **THE** second largest telescope in the world, being built at the University of California's Lick Observatory at Mount Hamilton, Calif., will go into operation two years ahead of schedule. Purchase of a 120-inch mirror cast in 1933 to test the design for the giant 200-inch Palomar telescope makes this possible.

Lick's new 120-inch mirror is now in a warehouse in San Jose near there, after a 400-mile truck trip from Pasadena. It will remain in the warehouse until the dome at Lick Observatory is completed. The 120-inch mirror was purchased from the California Institute of Technology, but has never been used because of a change in test procedure there.

The original design for the Lick telescope called for the conventional solid disk mirror. Recent tests at Palomar, proving beyond doubt the practicality of the new 200-inch design, led University of California astronomers to purchase the 120-inch test mirror of the same design.

Science News Letter, September 10, 1949

E FIELDS

AERONAUTICS

Freezing Process Aids Removal of Plane Blades

➤ THEY are freezing them off in England that is, they are removing airplane propeller wood blades from their steel hubs by a low temperature process

These laminated wood blades are screwed into what is called a steel ferrule, by which they are fastened to the propeller boss in the engine shaft, and are tightly fastened with a special cement. Because great force is required to break the cement in trying to unscrew the blades, an easier process was desired.

Frigidaire engineers in Portsmouth, England, are responsible for the new process, according to Frigidaire Division of General Motors, Dayton, Ohio. Their suggestions were made to the Air Screw Company, of Weybridge, which has many occasions to remove wood blades from their ferrules. The new process is based on the fact that wood contracts about three times as much as steel when temperatures are reduced.

A special cooling cabinet is used. Its well-insulated chamber will hold eight propellers at a time. Low temperature is provided by a one horse-power air-cooled compressor. Between six and eight hours are required for the majority of blades to shrink sufficiently to allow them to be easily removed from their hubs.

Science News Letter, September 10, 1949

ANIMAL HUSBANDRY

Pluck Molting Rabbits For Best Wool Is Advice

➤ HERE is a tip for those who raise rabbits for wool: most top-grade wool is obtained from an Angora rabbit by plucking the animal when it is molting.

There is no significant difference between the total amounts of wool obtained during a year by plucking, clipping or shearing, irrespective of whether it is harvested every 10 weeks or at the time of molt. But in the production of top-quality wool, the method and time of harvest do make a difference, experiments conducted by the U. S. Department of Agriculture at Beltsville, Md., show.

When the wool is clipped or sheared every 10 weeks, only about 35% is top-quality wool, when the wool is harvested during molting season, about 55% is of No. 1 grade. Dr. Thora Plitt Hardy and Ethel H. Dolnick of the Bureau of Animal Industry found. When the wool is plucked, however, the percentage of top-grade wool is the highest of all.

The wool, found to grow irregularly, averages about 0.27 inch per day.

Irrespective of these findings, however, breeders may still prefer to clip or shear Angora rabbits so as to save time in harvesting the wool. Or they may still harvest it at 10-week intervals rather than trouble to examine the rabbits periodically to discover the exact time of molt.

Science News Letter, September 10, 1949

BIOCHEMISTRY

Work on Isolating Fatty Chemical Present in Cancer

➤ FIRST steps toward isolating in pure form a fatty chemical believed involved in cancer development and possibly indicating a germ or virus cause of cancer have been taken by Drs. N. Waterman and L. C. Ebeling at the Netherland Cancer Institute at Amsterdam.

Reporting their progress in the journal, SCIENCE (Sept. 2), they state that the chemical is an antigen discovered by other scientists some years ago. The antigen was previously reported able to call up in rabbits' bodies antibodies specific against it, acting in this respect like a germ or virus.

The Amsterdam scientists report their work in the hope that it may help others to determine the chemical nature of the fatty substance. If this is done, they state that they believe "an important piece of work will have been performed."

Science News Letter, September 10, 1949

CHEMISTRY

Permanent Flame-Proofing Doesn't Affect Fabric

➤ COTTON and rayon fabrics which won't burst into flames when lighted, yet look the same and feel the same, should be available within the next three months.

No matter how many times these materials are washed at home or cleaned, they can now be made to stay fireproof when treated with a new chemical announced by the Dupont Company.

The exact chemical composition of the compound is being kept a secret because patents have not yet been issued, but it is known that the chemical is a solution of titanium and antimony salts.

Titanium dioxide and titanium hydroxide, and antimony oxide and antimony oxychloride are compounds which are known to produce a flame-proofing effect.

It is claimed that the compound reacts chemically with the molecule of cellulose in rayon or cotton, but does not change the size of the fiber. Nor does it make the fabric stiff or hard.

Expected to be particularly good for curtains and bedspreads, dangerous fire hazards in the home, the new discovery is trade-named "Eripon."

Science News Letter, September 10, 1949

PSYCHOLOGY

Brain Waves Found Linked To Voluntary Movements

➤ A LINK has been found between the alpha rhythm brain waves and voluntary muscular movements in experiments conducted at the Neuropsychiatric Research Center, Whitchurch Hospital, Cardiff, and reported in the scientific journal, NATURE (Aug. 27).

The alpha rhythms are electric signals broadcast by the brain cells themselves while the body is at rest. The rhythm is ordinarily interrupted by use of the eyes in vision.

Simultaneous recordings were made of the alpha rhythm and of the opening of the eye in response to an auditory signal. It was found that the eye tends to open at the time of the peak of the alpha rhythm which occurs about every tenth of a second.

Similar results were obtained for other voluntary movements.

These results indicate that voluntary muscular movements are influenced by the electrical rhythms of the brain, is the conclusion of the investigators, Drs. G. O. Kibbler, J. L. Boreham and D. Richter.

Science News Letter, September 10, 1949

PHYSIOLOGY

Height Children Will Grow To Is Predicted

➤ HOW tall a growing child will be when he is grown up is now being predicted to within a quarter of an inch by scientists at Stanford University.

The predictions, useful in treating abnormal growth and for reassuring parents and youngsters, are based on the relation between human growth patterns and the development, or maturation, of the skeleton.

Sex, age in years and present height are considered in relation to the maturation of the skeleton. When this last is within one year of the age in years, the height prediction is given by tables developed by Dr. Nancy Bayley of the university's school of medicine.

She and Dr. Leona M. Bayer of the school of medicine report eight cases in which the adult heights came out to within one-quarter of an inch of the heights predicted while the patients were children.

The doctors emphasize in their report to the Stanford Medical Bulletin that the predictions are only a statement of potential, not a promise. When growth or maturation or both are disturbed, the potential may never be realized.

The height predictions are useful in cases of retarded or accelerated growth for telling whether treatment by diet, thyroid extract and male or female hormones is being effective.

Science News Letter, September 10, 1949

CHEMISTRY

'Soapless Soaps' Do Many Jobs

Advantages of synthetic detergents over soap are that they save time and energy in cleaning and are effective cleaners in all kinds of water.

By ANN E. EWING

➤ "SOAPLESS soaps," the cleaning agents which often look like soap, act like soap, but aren't really soap at all, are making household chores easier and less time consuming.

Rings no longer appear on the bathtub and washbowl.

Dishes and glasses are rinsed dry and sparkling clean.

Woolens are washed in one-fifth the time formerly required, in cool water with no matting.

Rugs, upholstery and woodwork are quickly and easily shampooed.

Saving time and elbow grease, the soapless soaps are also known as synthetic detergents. Biggest advantage of these competitors to soap is that they clean effectively in all kinds of water—hot or cold, hard or soft, fresh or sea.

Soap, somewhat similar to that we know today, is known to have first been made by the Romans from tallow and beech ashes. Until about 30 years ago it was undisputed champion for a cleaner world.

Drawbacks of Soap

But there are many disadvantages to using soap. It is practically insoluble in cold water. It is decomposed in acid solutions. It forms a soft, gummy residue by combining with the lime or magnesium salts found in hard water.

Many of these disadvantages are not too objectionable in the home. In industry, however, there are certain operations which are preferably carried out in acid solution, in the presence of metallic salts, or in cold water. These special problems spurred the search for substitutes, synthetic detergents.

The word detergent is not new—it's just one which for a long time went unused. Actually, a detergent is any agent which assists in cleaning. Soap was the most familiar example until the shortage of fats during the war gave the synthetic detergents their big chance.

Soaps and synthetic detergents are cleansing agents because they have the ability to "wet" a surface, to remove foreign material from that surface and to keep the removed material from resettling on the surface.

Dirt or soil is the most usual foreign material found in the home. It is a combination of substances which are soluble in water, and hence offer no problem, and substances which are insoluble in water, mostly particles which are more or less

oily. Removing these particles from a surface, then, is the cleaning problem.

In order for a soap or synthetic detergent solution to remove these oily particles, it must first wet them. Water alone will not do the trick, because of its high surface tension. Floating a needle on water, or examining the shape of a drop of water on a polished surface demonstrates the fact that the surface of water acts like an extremely thin elastic covering.

"Wetter" Water

Certain materials will reduce the surface tension of water. These are known as surface active agents, and both soap and synthetic detergents are examples. Their ability to make water "wetter" has been startlingly demonstrated by the duck which sinks in water to which a detergent has been added. The thin coating of oil which traps air beneath the feathers to keep the duck afloat is wetted and the duck sinks in water.

Getting something clean depends not only on getting it wet, but also on removing the particles from the surface, known as

emulsifying. An emulsion is a fine suspension of one liquid in another, such as the butter fat in fresh milk. Dirty dishwater is also an emulsion—of fine dirt and oil particles in sudsy water.

The third requirement for cleaning, keeping the removed particles in suspension, is known as dispersion. These three properties, wetting, emulsifying and dispersing are dependent upon surface activity.

The molecules of the surface active agents, soap and synthetic detergents, can be thought of as similar to minute tadpoles. Odd little tadpoles, to be sure, with a tail which hates water and a head which loves water!

When a detergent, either soap or synthetic, dissolves in water, the molecules at the surface have their heads, water-loving, pointed toward the water. This leaves the tails pointing away from it, where they are in an excellent position to attach themselves to oily dirt.

Water-Dirt Link

Thus the detergent molecules are the link between dirt and the water which is used to rinse it away. They allow a thin wedge of water to come between the dirt and its adhering surface, preventing them from sticking to each other.

By varying the materials from which the



ADVANTAGE OF SYNTHETIC DETERGENTS—Soapless soaps in the left beaker give plenty of suds, even in hard water, while soap forms gummy curds in the right beaker.



SUDSY BATH—Children play with happy smiles in billowy suds when synthetic detergent is added to their bath water.

synthetic detergents are made, they can be tailored to do a specific job. They are used in toothpastes because they taste better than soap, for bubble baths because some types will foam in any kind of water, in automatic laundries because other types give maximum cleanliness with a minimum of suds, in mouth washes because still other types have antiseptic properties, and for food preparations because yet another variety is tasteless and odorless.

Street cleaners are finding the new products helpful for their jobs. Grease and oil which remains untouched by ordinary water is out of harm's way when as little as five pounds of synthetic detergent is added to the water tank.

Addition to the synthetic detergents of certain materials, known as builders, makes it possible for the product to compete on a price basis with soap. A builder is a substance which has little cleaning action itself, but which improves the cleansing action of the detergent. Most of the synthetic detergents available today in stores contain these builders.

The dry cleaning industry uses synthetic detergents in solvents and in mixtures for spotting. In painting, surface active agents help to produce a better bond between the coating and the surface.

Synthetic detergents can be used in smaller quantities than soap. If a certain amount will do the job, twice that amount will NOT do it twice as well. Doubling the effective quantity may actually decrease the washing efficiency.

Before the war, soapless soaps represented only about one percent of American washing materials. Today, they represent 15%, an even more significant gain than these figures would indicate because the use of

all types of cleaning compounds has increased greatly in the last ten years.

The fats from which soaps and some synthetic detergents are made are an essential part of our diet. In many parts of the world there is a shortage of fats so serious as to be a famine. The increased use of synthetic detergents from petroleum releases some of the fats for use as food

which would otherwise be used to make soap.

Samples of these soapless soaps, with experiments you can do yourself, are available from Science Service. Write Science Service, 1719 N St., NW, Washington 6, D. C., for one of these kits, enclosing only 50 cents.

Science News Letter, September 10, 1949

MEDICINE

A-Bomb Can Speed Cancer

➤ A SHORTER life and earlier appearance of cancer are likely to be the fate of atom bomb survivors, Dr. Egon Lorenz of the U. S. National Cancer Institute declared at the Gordon Research Cancer Conference held in New London, N. H., sponsored by the American Association for the Advancement of Science.

He referred to "extensive animal research at the National Cancer Institute and elsewhere" as basis for his statement.

Dr. Lorenz disagrees with "people in responsible positions" who have recently been quoted as saying that the hazards of an atomic bomb explosion are comparable to other hazards of war and therefore there is no need to be alarmed over them.

"There is a vast difference as far as effects later in life are concerned," he stated. "Usually the survivors of an explosion by ordinary bombs or incendiaries may, in the vast majority, not expect any special ill-effects later in life. True, some may be crippled by loss of limb but they will adjust and they will be able to live their full life expectancy."

"In other words, the body will forget the injury received and the individual will live on as though the injury had never happened. This, unfortunately, is not true in an atomic bomb explosion in which the body is exposed to penetrating radiation. The body will remember the injury received."

A definite correlation between total dose of radiation and life span was shown in experiments in which the whole bodies of animals were exposed to radiation, as they would be in case of an atomic bomb explosion, for a short time. The time of exposure was a matter of minutes. No experiments were done with exposure time comparable to that of an atomic bomb which is of the order of a millionth of a second, Dr. Lorenz explained.

"The greater the exposure at a given age, the more the life span is shortened," Dr. Lorenz reported.

"This, in severe cases, may mean a loss of many years of life. Furthermore, in the species of animals used, cancer occurred at an earlier age than in non-irradiated control animals. Again, like the shortening of life span, this shifting of the cancer age to a younger age is also dependent on the amount of radiation received, which in

some animals is quite small—so small, in fact, that probably very little immediate effect is noticed."

Science News Letter, September 10, 1949

PSYCHOLOGY

Prejudiced People Have Distorted Memory of Events

➤ CHILDREN who are highly prejudiced against foreigners or minority groups have a biased or distorted memory of things that happen to them and of stories read to them, the American Psychological Association in Denver, Colo., learned from a report by Dr. Else Frenkel-Brunswick, of the University of California.

After listening to a story dealing with school children's attitudes toward newcomers and stressing aggressiveness versus friendliness and protectiveness, the prejudiced children remembered the aggressive characters in the story, the unprejudiced children recalled the friendly characters.

A fight was, in fact, the only incident remembered from the story by 42% of the prejudiced children. Only 8% of the unprejudiced children were so exclusively impressed by the fight.

The prejudiced are inclined to lose sight of the overall picture of what the story was about and remember only isolated phrases or details. Once they have formed an idea of the story, they tend to ignore any part of it that does not fit in with the fixed idea.

Science News Letter, September 10, 1949

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WILDLIFE

Saving Rare Animals

➤ TEN animals will soon be dead as the dodo unless man protects them, wildlife experts say

Among these vanishing "living textbooks of scientific knowledge," the largest is a five-ton rhinoceros that lives in Java, and the strangest is a ten-inch rabbit-like creature from Australia called the pig-footed bandicoot

The rhino, a one-horned type, was nearly wiped out during the Japanese occupation of Java. All that is saving the few survivors from immediate extinction is the natives' dread of the tigers that share the rhino's Javanese jungle.

The bandicoot's nemesis is not Japs but sheep. Sheep, rabbits, and bandicoots all eat the same thing, and the bandicoot is finishing a poor third. To make matters worse, the hungry bandicoot has himself become an item on the menu of dogs imported into Australia. Ironically, one of the bandicoot's native enemies, the Tasmanian wolf, is similarly being starved out by roaming dogs and cats which beat it to its food.

Two waning fur-bearers are the royal chinchilla of Peru and the wolverine. Although swift and timorous, the chinchilla has not succeeded in eluding the law-breakers. Today only a remnant is believed to exist high in the inaccessible rocks of the Peruvian Andes. The ferocious wolverine, which was once so important a source of fur that Michigan became known as the Wolverine State, is now abundant only in Alaska.

The American Buffalo's continental cousin, the European wisent is going. So is the once-numerous Asiatic lion of which only about 200 survive. Some 500 giant sable antelope remain in Africa and of the brow-antlered deer there are "only a few hundred left in Burma." South African mountain zebra are down to a handful, mostly in zoos.

The ten vanishing animals were listed by Dr. Antoon de Vos, formerly of the Netherlands East Indies, now with the

Canadian Department of Lands and Forests. He is one of several hundred scientists invited to UNESCO's International Technical Conference on the Protection of Nature, held at Lake Success, which has just ended. The one-week conference has been considering such other problems as the effects of DDT and other insecticides on the balance of nature, and the consequences of introducing an animal into a new environment, in addition to the problem of vanishing species. Conservationists here are hopeful that by setting up wildlife preserves and by tightening and enforcing game laws, they will rescue these animals from the dodo's fate.

Science News Letter, September 10, 1949

ARCHAEOLOGY

Controversy Over Whether Tawide Made It

➤ "MADE in America" may some day start a scientific controversy, judging from this story of Danish scientists.

In 1947, a Danish peat digger uncovered a plain wooden box which has settled a dispute of long standing among students and experts of the Old Norse language.

The box with a sliding lid may have been used for keeping a razor, sewing needles, or perhaps bait for a fisherman. Archaeologists estimate its age to be at least 1,400 years.

On the side is carved "Hagiradar—Tawide." Hagiradar is a man's name. It means "one adept at giving advice."

"Tawide" appears here for the second time. It came to light the first time on the Little Gold Horn at Mogletonder, South Slesvig. This horn is engraved with pictures and the word "Tawido."

One school held that "Tawido," first person singular, was the name of the artist who made the engraving. Others maintained it was the name of the man who made the horn.

Because the small box uncovered at Stenmagle with the name contains no ornamental work, it is now conceded that "Tawido" means maker. Translated into modern English the inscription should read, "Made by Hagiradar."

Science News Letter, September 10, 1949

MEDICINE

Asthma Relief Follows Jaundice Infection

➤ DRAMATIC relief from asthma in three chronic sufferers followed jaundice infection, Dr. Nathan Gorin of Harvard Medical School and the Children's Medical Center in Boston reported.

The mechanism at work is unknown, al-

though fever and surgery have also been known to bring temporary relief from asthma, Dr. Gorin stated in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Sept. 3).

One patient had been a chronic asthma sufferer for 24 years, depending on drugs for relief. With the first signs of nausea and abdominal distress, which was later diagnosed as jaundice, the patient's asthma was milder. Relief lasted for 10 weeks.

Another patient, who is thought to have developed jaundice from a blood transfusion, was immediately free from the symptoms of asthma and hayfever. Eventually he was cured of the jaundice but the allergies did not return.

The third patient got little relief from her asthma in the medications she was taking until she suddenly developed jaundice stemming from a cancer of the liver. Her asthma then became milder than it had ever been since it first developed.

Dr. Gorin feels that these cases, and others in which jaundice has relieved arthritis, point to certain reparative powers within the person that are set free when changes occur in the liver. Animal experiments and clinical studies are being made to discover the mechanism behind this.

Science News Letter, September 10, 1949

MEDICINE

Convulsions Brought on By Some Allergy Drugs

➤ TWO anti-allergy drugs have shown that they can bring on convulsions in certain epileptic patients in tests reported by two Philadelphia physicians.

The drugs, benadryl and pyribenzamine, are known as antihistaminic because they check the action of histamine, a poison released by the tissues in allergic reactions.

The effect of the drugs on the patients was gaged by the electro-encephalogram, which measures the tiny electric current generated by the brain.

Both of the drugs increased the number of attacks in patients with focal lesions of the cerebral cortex, which is usually an uncontrollable jerking of one side of the body, Drs. John A. Churchill and George D. Gammon of the University of Pennsylvania stated in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Sept. 3).

Benadryl showed some promise as a remedy for patients with petit mal, a mild form of epilepsy, in that there was a slight improvement in the electrical wave pattern of these patients. Pyribenzamine had the opposite effect on petit mal patients. It excited a greater abnormal activity of the electrical impulses in the brain, the physicians stated.

Drs. Churchill and Gammon urge that antihistaminic drugs be used with care in the treatment of patients who suffer with convulsive disorders since the drugs have been proven to bring on attacks.

Science News Letter, September 10, 1949

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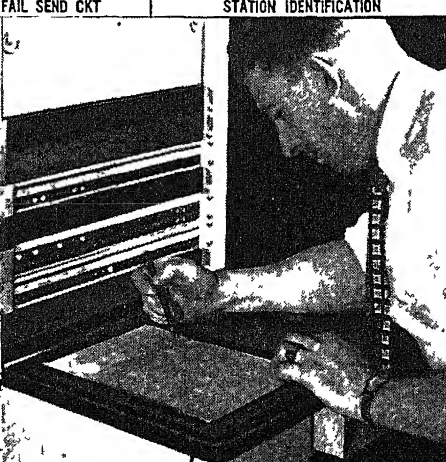
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SP LINE FAIL AT SW MAIN							

CARRYING hundreds of telephone calls, coaxial cable runs through many lonely miles far from towns and people, master amplifying stations stand guard with a new automatic alarm system developed by Bell Telephone Laboratories.

At a city terminal, the man on duty checks by laying a log sheet over a glass window, dialing a master station hundreds of miles away. At once the station gives an account of itself, lighting lamps under the log sheet to report any abnormal operating condition before it becomes an emergency.

But when something happens that threatens serious trouble, the apparatus acts at once—maybe by switching in a spare coaxial—and calls a distant test board by ringing a bell. Sometimes he can take further steps by remote control, if not, he knows exactly how to brief the nearest repair crew.

With this new alarm system, maintenance men need not be stationed at isolated points, just waiting for something to happen. Instead, they live in their home communities. This makes for better work and better telephone service.



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Foe Into Friend

► UNTIL quite recently, man has regarded the forest as his enemy. He who made a clearing was a benefactor to the community as well as an operator for his own gain, the new field increased the potential food supply, and added the resources of one family to the communal defense against a hostile world of savage beasts, and even more savage men, that lurked behind the leafy frontier. This culture-pattern of making a virtue of getting rid of trees in order to get at the land, is

of recent memory in this country, but it only repeated what happened a few centuries ago in Europe.

How completely this attitude toward the forest has been reversed is almost dramatically demonstrated in the recently issued U S Department of Agriculture Yearbook for 1949, which is titled, simply *TREES*. The forest now is our friend—and suddenly discovered to be an old and rather ailing friend, needing sympathetic assistance of every kind to aid in recovery and restoration of helpful strength. In the scores of articles that fill its nearly 1,000 pages, the good we derive from the forest is rehearsed from every angle, the harm we do to it, wittingly and unwittingly, is set forth just as painstakingly, and possible cures or preventive for its many ills are described, each by a scientific specialist.

About the only prescription there was for the forest a century ago was the rough surgery of ax and saw and the harsh cauterization of reckless fire. But now we see planting dibbles and spades, pruning knives and shears, insecticides and fungicides, all solicitously applied in the infancy and youth of the forest, so that in its maturity the ax and saw (more judiciously wielded now) may have a measured harvest.

We see, too, the manifold kindnesses that man may win from this ancient friend, once looked upon as a foe. Our grandsires saw only logs for cabins, later boards and squared timbers for more pretentious houses, plus, possibly, some potash for the soapmaking and a few casual nuts and wild fruits. We still get these (though not in such abundance) but we have added the endless acres of newsprint we read every day, chemicals ranging from synthetic lacquer to synthetic liquor, protection for our cities' water supplies, pleasant places for camping, hunting and fishing, and other items quite literally too numerous to mention. No wonder we feel as if we had almost murdered Santa Claus!

Science News Letter, September 10, 1949

PSYCHOLOGY

Introduction to Person Affects First Impression

► YOUR first impression of a person you meet is governed a good deal by what you are told about him by the person introducing him.

This was shown by an experiment in which a substitute instructor was presented to three classes of college men who were asked to rate the instructor's personality.

Half the students were told that the instructor is "rather cold." The others were told that he is "very warm."

The students who were tipped off that the substitute was a warm person later rated him as more considerate of others, less formal, more sociable, more popular, more humorous, more humane and better matured, than did those who expected him to be cold.

The students who had the expectation that the substitute would be warm also participated more in class discussion than did the other students and so had more opportunity to get acquainted with him.

The experiment was reported to the American Psychological Association in Denver, Colo., by Dr. Harold H. Kelley, of the University of Michigan.

Science News Letter, September 10, 1949

AGRICULTURE

Herring Industry Subject Of International Meeting

► THE all-important herring industry, which supplies the world with great quantities of fish food each year, was the subject of an international conference at The Hague in the Netherlands, attended by representatives of the major fishing countries, including the United States.

The meeting was called by the Food and Agriculture Organization of the United Nations, with headquarters in Washington, D. C. Invitations were sent to practically all countries of Western Europe, Greece, Poland, Yugoslavia and Canada, as well as to the United States.

The major subject of discussion was the economic problems related to the production and distribution of herring and allied species. It was expected that the meeting will iron out difficulties in individual nations which must be solved through international action, and would agree on a course of action for the solution of these problems.

The herring problem is of particular interest in America, coming into prominence in the past few decades. Herring fisheries in northwestern Europe are very old and have played an important part in history. In more recent years, herring species similar to those of Europe have become of importance to Canada, the United States and Japan. In the late thirties, these three countries together accounted for more than half of the world's total catch of herring and allied species.

Science News Letter, September 10, 1949

Words in Science—HEAT STROKE

► HEAT STROKE and heat exhaustion are two summer ailments which are not the same and require opposite treatments.

Symptoms of heat stroke are: Headache, red face, hot, dry skin with no sweating, strong and rapid pulse, very high temperature, usually unconsciousness.

Symptoms of heat exhaustion: Pale face; moist, cool skin with profuse sweating, weak pulse, low temperature, sometimes nausea, vomiting and giddiness.

What is commonly called "sunstroke" may be either of these two conditions.

Science News Letter, September 10, 1949

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THE EPITOME OF ANDREAS VESALIUS—L R Lind, Translator—*Macmillan*, 103 p, illus, \$7 50 The first English translation from the Latin of this famous physician's work

FREEZE-DRYING Drying by Sublimation—Earl W Florsdorf—*Reinhold*, 280 p, illus, \$5 00 A technical book on the principles and practical applications

THE FUNDAMENTALS OF ELECTROMAGNETISM—E G Cullwick—*Cambridge University Press*, 2nd ed, 327 p, illus, \$4 00 For the student of electrical engineering

FUNDAMENTAL CONSIDERATIONS IN ANESTHESIA—Charles L Burstein—*Macmillan*, 153 p, illus, \$4 00 A monograph Attempting to answer questions concerning complications that may arise during surgical intervention

ISOTOPES—Isotopes Division—*United States Atomic Energy Commission*, 45 p, illus, paper, free upon request to publisher, Oak Ridge, Tenn A catalogue for those interested in the procurement or use of radioisotopes

MATTER, MIND AND MEANING—Whateley Carington—*Yale University Press*, 257 p, \$3 75 The author tells how he believes the researches in psychical phenomena can be incorporated into a philosophy based on the well-explored and well-established sciences

NORMALCY TESTS OF PRECIPITATION AND FREQUENCY STUDIES OF RUNOFF ON SMALL WATERSHEDS—W D Potter—*Gov't Printing Office*, 24 p, illus, paper, 40 cents Results

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THE RAT IN LABORATORY INVESTIGATION—Edmond J Farris and John Q Griffith—*Lippincott*, 2nd ed, 542 p, illus, \$15 00 Contributions from twenty-nine authorities

SOCIOLOGY—Emory S Bogardus—*Macmillan*, 3rd ed, 598 p, \$4 50 A beginning college text

THE SPECTRUM OF NOVA PERSEI 1901—Dean B McLaughlin—*University of Michigan Observatory*, Vol IX, No 3, 71 p, illus, paper, free of charge upon request to publisher, Ann Arbor, Michigan The first nova to have a detailed and fairly continuous spectroscopic record is here analyzed at considerable length

SUBJECT HEADINGS FOR AERONAUTICAL ENGINEERING LIBRARIES—Committee of the Engineering-Aeronautics Section—*Special Libraries Association*, 245 p, illus, paper, \$4 00

TOPOGRAPHICAL ANATOMY OF THE DOG—O Charnock Bradley and Tom Grahame—*Oliver and Boyd* (Macmillan)—5th ed, 319 p, illus, \$7 00 Revised and brought up to date A textbook intended as a guide for dissection.

TREES The Yearbook of Agriculture—United States Department of Agriculture—*Gov't Printing Office*, 944 p, illus, \$2 00. A compilation of articles by leading authorities Beautifully illustrated Covers shade trees for the home, tree farming, forest care, and the identification of woods

THE UNITARY PRINCIPLE IN PHYSICS AND BIOLOGY—Lancelot Law Whyte—*Holt*, 162 p, \$3 50 A philosophical work advancing the author's conviction of the unity of nature

Science News Letter, September 10, 1949

degrees Fahrenheit to the "dripping heat of the tropics" has been built for the research being conducted by Dr William J Dieckmann, chief-of-staff and professor of obstetrics and gynecology

The onset of the convulsions and coma of eclampsia in pregnant women is definitely related to hot, humid climate, Dr Dieckmann found from a statistical study

Eclampsia, most frequent during the last two and three months of pregnancy and especially during labor, is said to be one of the two greatest threats to safe childbirth and is fatal in 13 out of every 100 cases that develop in expectant mothers

Sudden changes in weather, although not the cause of the condition, may, Dr Dieckmann thinks, bring on in susceptible patients changes in water balance, circulation and acid base equilibrium which intensify the high blood pressure, dropsy and kidney disorder until convulsions and coma occur

The climate room will be used to find out whether the convulsions and coma can be warded off by controlling the weather and also what conditions of temperature and humidity are most helpful to the patient

Refrigeration for the room, unlike air conditioning, uses a brine solution for securing proper temperature and humidity

Science News Letter, September 10, 1949

BIOCHEMISTRY

Efficiency of Green Leaf

➤ THE green leaf, the sun-stoked factory which creates food for man and other animals, has an efficiency rating of at least 65% and maybe as much as 85%

"Conclusive" findings for this rating are reported by Drs Dean Burk, Sterling Hendricks, Mitchell Korzenovsky, Victor Schocken and Nobelist Otto Warburg in the journal, *SCIENCE* (Sept 3)

The research in which the green plant's efficiency was rated was done at the U S National Cancer Institute in Washington, the U S Plant Industry Station, Beltsville, Md, and at the Marine Biological Laboratory, Woods Hole, Mass

Plants, using energy from the sun, combine carbon dioxide from the air and water from the earth to form starch and sugar In the process, the oxygen is broken out of the water and set free in the atmosphere.

Using new experimental techniques, the scientists have shown, as Dr Warburg demonstrated by more complicated tech-

niques in 1933, that energy in the form of photons of light can be made to liberate oxygen atoms in the plant's photosynthetic process with nearly perfect efficiency In other words, the plant does this with full utilization of the energy from the sun and relatively little loss of energy in the form of heat

Science News Letter, September 10, 1949

MEDICINE

"Climate Room" Will Help Save Expectant Mothers

➤ SAVING expectant mothers from eclamptic convulsions and death by scientific weather control is the hope of research now going on at the Chicago Lyng-in Hospital and Dispensary of the University of Chicago

A "climate room" where the weather may be varied from crisp coolness at 50

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⚙️ **FIRE-PROTECTION** paint, of ordinary thickness as applied, puffs up under the intense heat of a blow-torch to a spongy mass about an inch thick that gives full protection to the wood under it. Designed for indoor use, particularly for basement ceilings, its varnish-like surface can be covered with conventional paint to provide color.

Science News Letter, September 10, 1949

⚙️ **POCKET MICROSCOPE**, about fountain-pen size, has a lens system built into an aluminum barrel and a fine-focusing button on the side which can be adjusted by the forefinger of the hand holding the instrument. In use, the end of the tube rests on the object to be examined.

Science News Letter, September 10, 1949

⚙️ **IMPROVED COOLER** for airplanes on the ground, for use at air bases in the tropics, is 65% lighter than an industrial refrigerating unit of the same capacity, utilizes air as the working medium, and is operated by a 100-horsepower air-cooled gasoline engine. It can thus be used where water is unavailable.

Science News Letter, September 10, 1949

⚙️ **ELECTRIC VACUUM** cleaner, shown in the picture, separates the dust it collects from the air it uses by means of a transparent plastic base that holds water. All air



taken in bubbles through the water and is automatically filtered, the dust settling to the bottom.

Science News Letter, September 10, 1949

⚙️ **ELECTRIC FLATIRON**, recently patented, has two revolving disks in the ironing surface which rotate at different speeds and in opposite directions. The faster and smaller disk is near the point-end of the

iron and smooths out wrinkles to facilitate free and easy gliding over the textile surface.

Science News Letter, September 10, 1949

⚙️ **ALUMINUM OXIDE** mortar and pestle, for use in pulverizing samples of very hard substances in laboratories, may be used to grind beryl, Carborundum, and similar materials with ratings below that of tungsten carbide. It is not magnetic, and will not flake to contaminate the contents.

Science News Letter, September 10, 1949

⚙️ **ELECTRONIC SCALE** for weighing livestock at public markets measures the weight of the animals accurately to within five pounds up to 32,000 pounds through electrical impulses, and records pressures electrically. When certain buttons are pressed, it prints the weight, number and type of animals.

Science News Letter, September 10, 1949

⚙️ **HEARING AID** attachment, to fix over the microphone worn under the clothes to eliminate noises that result from clothing movement, is called a clothing noise insulator and consists of a plastic ring backed with cork. It is easily attached by an adhesive applied to the cork.

Science News Letter, September 10, 1949

Do You Know?

"Corn" is an Anglo-Saxon word which means grain of any kind.

Nylon cord ties for airplanes provide decreased danger from blow-outs during landings.

Scorpions, several species of which occur in southern and western states, have long segmented tails which they curl over their backs when alarmed with the stinger at the tip ready for attack.

Cloves have been used for over 4,000 years to sweeten the breath.

Many types of clay will be satisfactory as a source of aluminum with new methods of extraction under development.

A landing strip has been constructed on the grounds of the Kansas State Fair because so many of the visitors are now "flying farmers."

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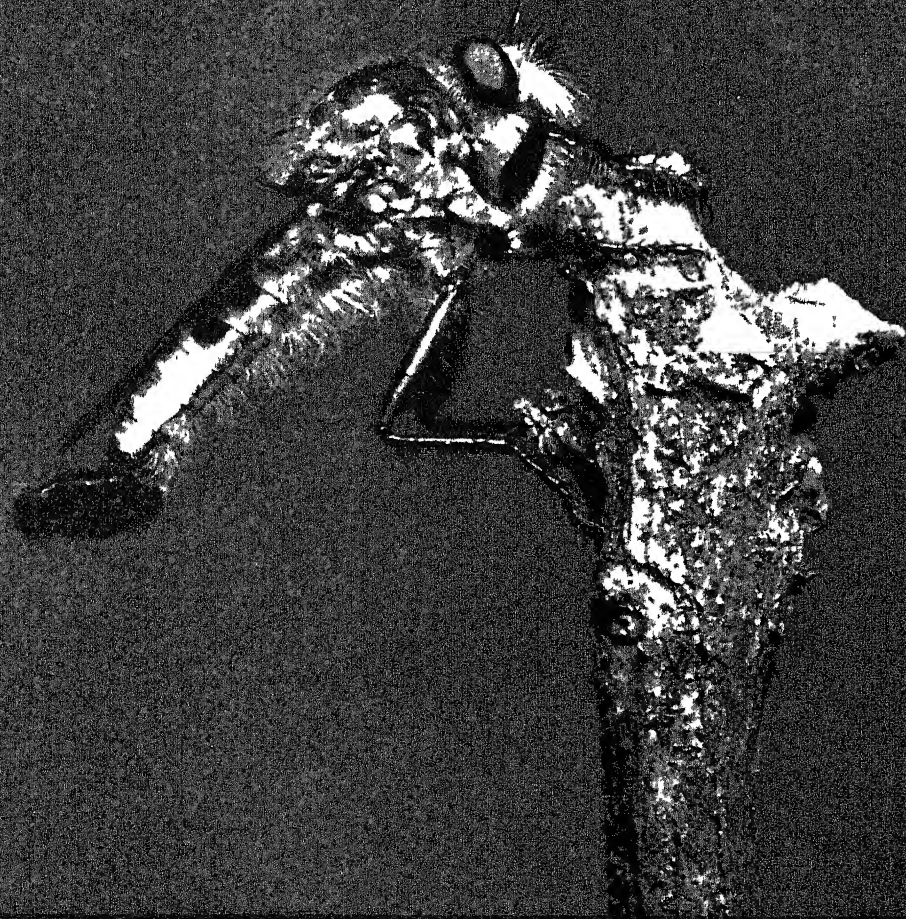


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MEDICINE

Cortisone May Aid Allergy

This is an unexplored possibility but the chemical comes from a gland which is known to react to the causes at the root of allergies.

➤ CORTISONE, the new and famous though scarce remedy for rheumatoid arthritis, may point the way to better treatment for hayfever, asthma and other allergies

This suggestion comes from Dr. Louis Prickman of the Mayo Clinic of Rochester, Minn., where only four months ago Cortisone's value in rheumatoid arthritis was discovered.

Cortisone's discoverer, Dr. E. C. Kendall of the Mayo Clinic, has conferred with other scientists in New York on ways to finance further research on the drug.

Cortisone is not suggested directly as a remedy for allergies in Dr. Prickman's report. He sees its success in relieving arthritis symptoms as showing "a promising new direction for allergic research."

"Rheumatoid arthritis and allergic diseases," he points out, "have any number of features in common and the underlying mechanism may be the same."

The allergic reaction, whether it comes as hayfever, asthma, hives or a reaction to penicillin, is a defensive process, Dr. Prickman explains. It is a "warning on the part of nature" that the cells of the body have met a harmful substance.

The outer rind, or cortex, of the adrenal glands which produce the hormone now called Cortisone is known to take part in an "alarm reaction" when the body gets under fatigue and psychological stresses

Infections, fatigue and nervous factors appear to be important causes of many of the cases of severe asthma, hives and other allergies which come on after middle age and usually without any specific cause such as a pollen, horse dander, certain foods, and the like.

This picture of allergies is the reason Dr. Prickman thinks allergy fighting might go ahead faster and more successfully by following the Cortisone—ACTH leads.

ACTH is the scientific shortname for another hormone chemical, the adrenocorticotrophic hormone. This hormone is produced by the tiny pituitary gland in the head, and acts to stimulate the adrenal gland cortex to produce its hormone ACTH. It has been found as effective as Cortisone, the adrenal cortical hormone, in rheumatoid arthritis but supplies of it are just as scarce as supplies of Cortisone. At present Cortisone is being partly synthesized, starting with bile from slaughtered cattle. The synthesis is extremely complex and difficult.

Possible plant sources, from the seeds of a vine, growing of which is illegal in Africa, to the tropical yam of the western hemisphere, are now being intensively investigated.

Dr. Prickman's suggestion on Cortisone and allergies was made to a staff meeting of the Mayo Clinic and is reported in the clinic's PROCEEDINGS (Aug. 17).

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and finally grounding on Mt. Parnassus.

Deluge stories are commonly found in southern Asia, and in Central, South and North America.

Reports coming out of Armenia state that a monastery in the village of Echmiadzin at the foot of Mt. Ararat has what is claimed to be a piece of petrified wood from Noah's ark, but other parts have not been found although the monks have searched for many years.

Science News Letter, September 17, 1949

MEDICINE

Hypnotism Found to Increase Muscle Power

➤ DISCOVERY that hypnotism can add muscle power may open up a new vista of hope for disabled veterans and polio victims, the American Congress of Physical Medicine meeting in Cincinnati, Ohio, was told.

In tests made by Dr. Sedgwick Mead, assistant professor of physical medicine at Washington University School of Medicine in St. Louis, patients gained on an average 16.8% in the strength of arm muscles when hypnotized. Their endurance capacities, however, were not affected.

Dr. Mead suggests that, based on this discovery, hypnosis may help in rehabilitating patients with injured arms and legs and in bringing back strength to polio-weakened muscles.

No applications of this method have yet been made on injured patients.

Science News Letter, September 17, 1949

MEDICINE

Allergy Linked to Cold-Susceptibility

➤ ALLERGY plays an important role in the susceptibility to colds, an editorial in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Sept. 10), pointed out.

This conclusion is based on the researches done by Drs. N. Fox, G. Livingston, J. W. Hained, and S. Peluse, of Chicago, who have studied over 3,000 cold-susceptible patients. Eighty percent of the first 1,200 patients studied showed an allergic condition or were from allergic families.

Here is how they believe allergy aids cold infection. Allergy may start by a fall in temperature and increase in humidity. The body responds by releasing histamine into certain shock centers such as the respiratory tract which weaken the local defense mechanism. This opens the way to attack by the cold virus or other germs.

The person susceptible to colds does not necessarily have an obvious allergy. The researchers found that this type of patient often has a borderline allergy which is mostly overlooked because the symptoms are so slight.

Science News Letter, September 17, 1949

ARCHAEOLOGY

Noah's Ark Fiction?

➤ SCIENTISTS in Washington suggest that those looking for Noah's ark may be in search of fiction.

Mt. Ararat has been climbed several times, and descriptions published of the peak make it very doubtful that any remains of the ark famous in Bible story will ever be found there.

Some are even doubtful that there ever was an ark in reality, it may be a symbol in ancient allegory.

The Bible account has its parallel in the ancient Babylonian traditions. In fact, the Babylonian account has such striking similarity to the Bible story that experts believe they must have had a common origin.

In each case, there is divine revelation of the coming of the deluge. Both stories relate the building of the vessel, pitching it inside and outside with pitch. In both stories, birds were sent out to test the

receding of the waters but in the Babylonian version, it was a dove, a swallow and a raven that went out in place of the three trips of the dove as in the Bible version.

In both versions, the ark came to rest on a mountain where a sacrifice was offered and in both versions it is recounted that "the Lord (or the gods) smelled a sweet savor."

An important difference in the Babylonian story is that the hero took with him into the ark not only the animals but also craftsmen of every kind so that the various skills known to man should not be lost.

In Greek legend, the king, Deucalion, was warned by his father, Prometheus, to build a chest (another meaning for the word ark) and in it he and his wife escaped from a flood, floating for nine days

ARCHAEOLOGY-ANTHROPOLOGY

Stone Age Man in Alaska

Buried stone age dwelling sites found in arctic Alaska open up a new frontier of American prehistory. So far, no human skeletons have been found.

► **DISCOVERY** of two buried dwelling places of mysterious stone age men who lived in arctic Alaska long before the earliest Eskimos, probably 10,000 years ago, has opened a new frontier of American prehistory.

Working independently, Dr. Louis Giddings of the University of Pennsylvania found an old campsite on Seward Peninsula and Dr. Helge Larsen of Copenhagen's Danish Museum found a cave 35 miles from Deering, both of which had flint implements mingled with caribou bones, showing a new kind of neolithic culture similar to that of stone age men of Asia and Europe.

Then findings were presented to the Twenty-ninth International Congress of Americanists in New York.

Since the discoveries were made only a few weeks ago, the finds are not yet positively dated, but they are certainly long before the Christian era and they are proof that stone age men, following the receding glaciers of the Ice Age, lived in what is now Alaska.

The buried evidences of Alaska's stone age men were found in layers of the earth below those of the earliest known Ipiutak Eskimos who hunted whales and used some iron tools bartered from Siberia. Below the Eskimo culture layer there was found a layer of undisturbed clay that accumulated when human beings were not there. Below were the signs of the stone age people, who used a special kind of small flint scraper implements, called microliths, that were made by knocking a long flake off a core of the stone.

No human skeletons were found, and anthropologists and archaeologists will be searching Alaska next spring when the country opens up for possible burials of this ancient people, as well as additional sites.

The best judgment now is that the stone age Alaskans are not the ancestors of the modern Indians or the Folsom men who are known so far only by their special weapon points found in archaeological excavations in western United States.

But they are considered to be of upper paleolithic and perhaps even middle paleolithic age which makes them the most ancient Americans so far found.

Science News Letter, September 17, 1949

ANTHROPOLOGY

Yuma and Folsom Men Probably Contemporaries

► **EVIDENCE** that the two main groups of Stone Age "Americans" were contemporaries about 10,000 years ago was presented to the Twenty-ninth International Congress of Americanists in New York by Dr. John Hall Moss, Franklin and Marshall College geologist.

Dr. Moss this summer studied the geological formations at the Finney Yuma site at Eden, Wyo., where Yuma points had been discovered. The Yuma points have been considered generally earlier than Folsom points, but Dr. Moss' findings indicated that Yuma man had been in southwestern Wyoming right up to only about 10,000 years ago. This puts him well into the period of Folsom man.

Yuma man apparently began earlier than Folsom, but the new evidence indicates that he continued throughout the period of Folsom man.

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ENGINEERING

New-Type Rubber Lifeboat Rides Waves Easily

► **A NEW-TYPE** rubber lifeboat, now in production by the B. F. Goodrich Company, Akron, Ohio, while weighing only 186 pounds, complete with emergency equipment, has sufficient buoyancy to support 12 men inside and 13 others clinging to lifelines hanging over the edges.

It is constructed of American-made rubber, is 14 feet long and six feet wide when in use, but on shipboard is a package four feet long and two feet wide. When thrown overboard in an emergency, a ripcord is pulled. The waterproof zippered cover unzips itself and pops off, whereupon the boat unfolds, inflates itself from gas cylinders and opens right side up in the water.

Two pounds of air in the twin-compartmented rubber tubes provide sufficient buoyancy for the load of 12 plus 13 men. Two inflatable floor partitions, each six feet square, can be tossed into the sea as life preservers for an additional 10 men. Already tested by the U. S. Navy and Coast Guard, it has been found to ride the waves easily even in a rough sea.

Equipment contained in the packaged unit includes a tent-like canopy, four wooden paddles, two air pumps, two carbon dioxide cylinders, a small boarding ladder, food and water rations, fishing kit, flashlight, signal mirror and dye sea markers. The canopy top can be used to catch rain water, as well as for protection.

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EMERGENCY RUBBER LIFEBOAT—Thirteen men can hold onto the lifelines alongside this boat while there is room for 12 men inside the boat. A Coast Guardsman is preparing to inflate the two six-foot square floor sections which can be thrown into the water to support an additional 10 men.

PSYCHOLOGY

No Drop in Intelligence

➤ OUR civilization is not growing dumber, losing its intelligence, although the wealthy and better educated classes are having smaller families

This assurance was given the British Association for the Advancement in Science in Newcastle-Upon-Tyne, England, by Dr. P. E. Vernon, psychologist for the British Admiralty

Other psychologists backed up Dr. Vernon who took issue with the opinion of Sir Cyril Burt, of the University of London, that by the end of the century the proportion of superior children will be half that in 1920 and the proportion of the very dull will be more than doubled

Although psychologists admit that the most intelligent are not passing on their gifts to the next generation because of their small families, still the children do not appear to be any dumber than their parents or grandparents

Perhaps something is wrong with the I Q tests, Dr. Vernon suggested. Maybe they are influenced by the environment or the children get higher scores as they grow more used to being tested

"There are great difficulties in proving the extent to which intelligence is inherited, either by pedigree, twin resemblance, or other investigations," he said

Prof. L. S. Penrose, another psychologist, expressed doubt of the prediction of geneticists that the intelligence level will decline. "Genes for high intelligence are apparently being continually lost but this is probably an illusion," he declared

Effects of slight changes in environment can easily surpass the effects of natural selection on human characters, he indicated. Also stable hereditary conditions can be produced by the intermarriage of differing kinds of people—a hybrid vigor—even in the

presence of the tendency of the intelligent and the stupid to marry others like them in intelligence

Two surveys of the intelligence of Scottish children indicate that the youngsters of today are actually brighter, not duller, than their elders

In 1947, a group intelligence test was given to all 11-year-old Scottish children. Results were compared with a similar survey of 11-year-olds in 1932. It was shown that the 1947 children are brighter, although the brightest children come from the smallest families

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CHEMISTRY-ENTOMOLOGY

Silicone Greases Collect Germs Effectively

➤ BACTERIA, pollen grains, fungus spores and other airborne troublemakers can be more advantageously collected on the sticky surface of a silicone grease than on vaseline, agar or other "stickums" now employed, Drs. S. M. Pady and C. D. Kelly of McGill University, Montreal, point out in the journal, *SCIENCE* (Aug. 19)

Glass plates or other objects smeared with sticky substances have been in use for some years for capturing microscopic objects floating in the air, sometimes on the ground, often on airplanes at high altitudes. All the media hitherto used change consistency with temperature, the two Canadian scientists point out. At the very low temperatures encountered in high airplane flights some of them freeze, lose their stickiness, and become unable to capture anything

The silicone greases, on the other hand, keep the same stickiness at deep sub-zero

temperatures that they have at summer warmth, and so will function as catchers under any circumstances. Moreover, they may if desired be sterilized by heat, still without changing the character of their surfaces

Science News Letter, September 17, 1949

Goldenrod, suggested by some as the national flower because it is distinctively American, is condemned by others in an erroneous belief that it is a prime cause of hay-fever.

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PHYSIOLOGY

No Machine Like Brain

The idea that a machine can be created to work like the human brain is attacked by a British scientist who believes the idea will be eventually discarded.

➤ MAN'S mind has not been able to make a machine that works like his own brain, Dr. Geoffrey Jefferson, professor of neurosurgery at Manchester University told the British Association for the Advancement of Science at Newcastle-Upon-Tyne, England, taking issue with the theory of cybernetics put forth by Prof. Norbert Wiener of Massachusetts Institute of Technology.

"There is no authority for assuming that the brain works like a mechanical or electronic machine," Dr. Jefferson said. "There is definite similarity, especially on the small scale of two nerve cells. But it may be a great mistake to assume that nerve action is the same throughout the infinitely complex human nervous system."

"We do not know how nerve impulse is translated into thought. We haven't the slightest clue to the mode of formation of worded concepts."

Man is the only animal who chops up sound to make speech, Dr. Jefferson said. But he believes that there may be an unrecognized similarity to speech in the lower animals.

Dr. Jefferson defined the brain as a collection of data stored as experience and synthesized into thought and responses to meet our needs.

He asked scientists not to forget that cybernetics merely points to an analogy.

"The mechanistic viewpoint will eventually, if reluctantly, be discarded," Dr. Jefferson predicted. "Man is indeed master of himself and it is his brain which makes him so."

Mechanistic explanations of the brain and mind are as fallacious as the physical laws of two centuries ago that helped biological progress although they were proved false, Dr. A. D. Ritchie, professor of philosophy of Edinburgh University told the scientists. The riddle of mind and brain will be solved by metaphysical thought and not on a physical basis, although the mechanical concepts may be temporarily helpful.

The human brain is not sufficiently developed evolutionally to achieve a comprehension of the intricacy of its own mechanism, Dr. Alexander Kennedy, professor of psychology and medicine at Durham University said, although he did not agree with Dr. Ritchie.

Sinfulness may have a physical basis, Dr. Kennedy said, since moral awareness is dependent upon nervous mechanism. This is shown in the case of amoral behavior patterns following encephalitis or leucotomy, an operation in which the white matter of the frontal lobes of the brain is cut.

Moral awareness is thus shown to be not purely subjective in the mind but based on physical factors.

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PSYCHOLOGY

Disability No Joke To Man Who Has It

➤ DISABLED persons laugh at the same jokes as do normal persons—provided the joke is not about a physical handicap, Drs. Milton W. Horowitz and Leola S. Horowitz, of the University of Kansas, told the American Psychological Association in Denver, Colo.

Eight crippled individuals and 13 non-handicapped persons were asked to rate jokes for humor and for humiliation. Some of these jokes were about various handicaps and others were "innocuous." Neither

the crippled persons nor the normals found one type of joke more humiliating than the other, but both found a difference in their humor.

Both groups agreed pretty well in their ratings of the "innocuous" jokes, but significant differences were found in the handicap humor.

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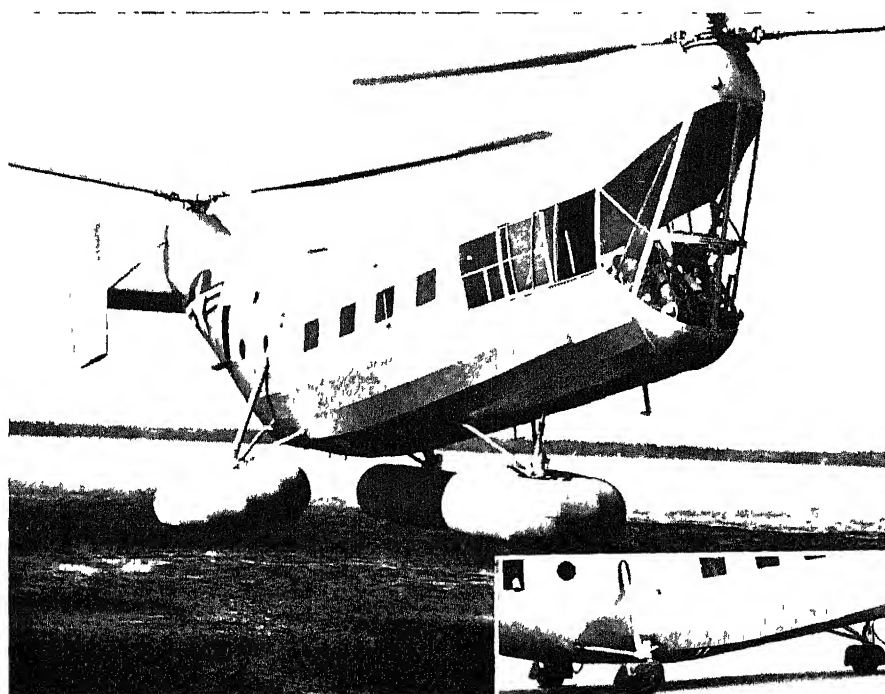
MEDICINE

Daily Alcohol Drinking Is Damaging to Brain

➤ ALCOHOL, drunk every day in large quantities, causes permanent damage to the brain. This is revealed in mental tests and also in the brain waves, or electric impulses from the brain itself.

The tests, which were conducted on 51 alcoholics without mental disease, were reported to the American Psychological Association in Denver, Colo., by Dr. Lucille B. Kessler, of Traverse City, Mich., State Hospital.

Alcohol is a potent poison, Dr. Kessler told the meeting. When in contact with the nervous system it can produce sludging of the red blood cells. This is a condition in which the blood does not flow smoothly, but forms clumps of cell masses which



HELICOPTER GETS FLOATING FEET—Nylon floats have been attached to the wheels of this tandem rotored Piasecki HRP-1 "Rescuer" helicopter of the U. S. Coast Guard. It enables it to set down easily on the water for emergency rescues. It was designed by Cmdr. Frank A. Erickson, head of the Rotary Wing Development Unit at Elizabeth City, N. C. The pilot needs only pull a cord to release the floats. Insert photo shows how compactly the floats fold around the landing wheels.

move slower than normal, occasionally blocking the blood vessel. The result is an oxygen starvation of the tissues and possibly the brain.

In addition to its direct poisoning effect, alcoholism is accompanied by lack of vitamins B₁ and C which makes the tiny (capillary) blood vessels fragile and may cause hemorrhages in the space between the skull and the brain.

MEDICINE

Inducing German Measles

➤ A GROUP of women in Australia have volunteered to get German measles, and some of them got the disease, in the fight to protect babies of the future from being born with cataracts or deaf-mutism or heart defects through this disease.

The experiment, conducted by the Hall Institute at Melbourne, Australia, is called to the attention of American physicians by the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Sept 10).

German measles, medically known as rubella, is a harmless disease to the person having it. But when it attacks a woman during the first three months of pregnancy, it is likely to cause defects of eyes, ears or heart in the unborn baby. Australian doctors were first to notice this relationship. English and American physicians have since confirmed the findings.

Infecting girls and young women with the German measles germ before they married has been suggested as one way of preventing the disease's harmful effects on future babies.

This can be done, the Australian studies, reported by Dr. S. G. Anderson, show. Material washed from the throats of patients with German measles was put into the noses of the women volunteers. Within 13 to 20 days after, some of them developed the typical German measles rash. A few days before they had swollen glands, also typical of the disease. Other persons susceptible to the disease got it from contact with the volunteers who had the experimental disease.

More than half, 14 out of 25, volunteers did not get the disease. Five of these had had the disease six to nine years before, it was learned, and the other nine probably had had it in a mild form that escaped notice at the time. Dr. Anderson thinks this is strong circumstantial evidence that a person who has had the disease will be immune to it for at least nine years. Artificially inducing the disease in a woman at the age of 20 could therefore be expected to protect her against the disease over the period when she would probably be having children.

Application of these results, the JOURNAL points out, will have to take into consideration the existence of a considerable proportion of persons resistant to the disease

The brain damage showed up, Dr. Kessler reported, in impairment of the memory, thinking, and social judgment and, in the worst cases, in difficulty with arithmetic.

The electric rhythm of the brain itself is abnormally fast and there is an absence of the special brain wave pattern known as the alpha rhythm which is ordinarily characteristic of the brain at rest.

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who have no history of having had it and the dangers of transmitting other infections.

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MEDICINE

Supposed Breast Cancer Shows Up As "Bobby Pin"

➤ THE 38-year-old housewife, mother of three children, went to her doctor because of a lump in her breast. Her mother and father had both died of cancer. The doctor, after X-rays and other examination, diagnosed the lump as cancer and advised an operation.

On the operating table the surgeon made a cut below the nipple, started to remove a piece of tissue for microscopic examination, and found a "bobby pin."

Reviewing the X-ray picture of the chest, the "bobby pin" could be seen but had been thought to be on the patient's clothes.

The patient herself had no idea how the pin got into her breast but thought she must have rolled over on it while sound asleep.

"The case appears to be unique," observes Dr. Franklin G. Balch, Jr., of Brookline, Mass. He reports it in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Sept 10), as "an unusual problem in the differential diagnosis of tumors of the breast."

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VETERINARY MEDICINE

Weight of Cattle Operates New Insecticide Duster

➤ THE weight of the animal itself produces the driving blast of air in an insecticide-dusting device for livestock on which Alfred Paul, Jr., Paul Spur, Ariz., received patent 2,480,601.

The cattle dusting takes place in a narrow chute through which the animals are driven. The insecticidal dust from nozzles in the side walls covers them completely. The necessary air blast to carry the dust is created by a bellows-like arrangement over which the animal must walk.

This is described as a depressible floor, over a small pit and mounted on coil

springs. The weight of the animal depresses the floor, compresses the air in the pit, and drives it out to the spray nozzles. By an ingenious arrangement, the proper amount of insecticide dust is added to the air.

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ICHTHYOLOGY

Echo Depth Finders Move In on Old Izaak Walton

➤ IZAAK WALTON would be astonished and dismayed to learn the latest techniques of catching fish proposed by fishery experts at Lake Success, N. Y.

The leisurely man with a long pole and the day to waste is giving way to impatient men with radar and no time to lose.

J. Renou of the French Navy's press information service told how radar and echo-ranging devices have been adapted to detecting fish and then identifying them.

He told the fishery section of the United Nations Scientific Conference on the Conservation and Utilization of Resources of an echo-ranging device that can detect any school of fish at distances varying from about 650 feet to more than a mile.

Study of the echo pattern enables the fisherman to tell what kind of fish they have located, he said.

Michael Graham, United Kingdom director of fisheries, cited similar work in England which has made it possible to identify herring, sardines and other fish at considerable distances.

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GENERAL SCIENCE

Modern Art Suffers from Our Treatment of Artists

➤ THE trouble with modern American art is the way we treat our artists and craftsmen, a scientist declared in New York.

Dr. Gene Weltfish, Columbia University anthropologist, explained to the Twenty-ninth International Congress of Americanists that artists suffer from anxiety and insecurity. They have to worry about losing jobs. They are looked down on by some people.

Compare this, Dr. Weltfish suggested, with the life of the basket makers of the Pima Indians of our own Southwest or certain Amazon tribes in South America. These artists and craftsmen are not troubled by the threat of losing their jobs. They are not "pushed around."

They do not have to worry "where the next meal is coming from."

However primitive compared with our standards, these tribes have a better way of life for the artist and craftsman than our modern factory-filled civilization, the anthropologist contended.

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PSYCHOLOGY

Avoiding Mass Murderers

There are many revealing signs and symptoms that can be detected in the people who suddenly become crazed and commit mass murders.

➤ **HOW** can people protect themselves from mass murders by crazed persons running amuck?

The New Jersey veteran who shot down over a dozen people is not the first such occurrence, nor will it be the last. In the Pacific Northwest the bloody Easter Sunday murders of this year are remembered.

Here are the signs to look for among your friends and neighbors who may do the same thing:

1 Anyone who goes to great extremes in his eccentricity should be watched. In the New Jersey case this took the form of overly-religious activity, Bible reading. In other cases it may be lavish spending of money, excessive drinking, or even being over-conscientious and meticulous. This is a form of getting away from reality, which is a sign of abnormal behavior.

2 Anyone who has an accumulation of firearms or other deadly weapons and takes undue interest in them should be suspected. Most states and cities have ample laws to prevent anyone from having such firearms. It is a matter of spotting the danger and then doing something about it.

3 Anyone who feels that people are after him, that he is being persecuted, that the FBI or the police are spying on him, or that neighbors or shadowy creatures are his enemies is likely to be suffering from a psychiatric condition. This is somewhat more recognizable as a dangerous condition and, of course, the persecution complex is not always present in persons who become dangerous.

Getting action before such people become overt and commit some crime is always difficult. But for the protection of the individual who is mentally ill—and that is what such murderers are—as well as the safety of the community, his friends and relatives should act.

Get the individual to a doctor, especially a psychiatrist or a hospital handling mental cases. Call upon authorities, such as police, court officials, etc., who will appreciate and handle such a situation.

This is the best general advice that psychiatrists, psychologists, and specialists in abnormal behavior can give.

The big problem in murder is prevention. Little can be done after the crime is committed. In his book, *THE SHOW OF VIOLENCE*, Dr. Fredric Wertham says:

"In the life of both the individual and society, murder is not the whole drama, but only one act. The negative emotions which find release in violence may be due to problems that seem entirely personal and far removed from the social setting.

But scientifically we still must ask why it is that in this particular person who lives in a society to which he should be tied by common rights, duties and aspirations, personal problems should loom so large."

Some psychiatrists feel that murders are likely to be more prevalent after a war. The late Dr. William A. White, pioneer in modern psychiatry, said "Nothing activates the aggressive instinct more seriously than does war. An orgy of killing lets loose and it is a good many years before it is ever chained up again."

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AERONAUTICS

New Guide on Metals Out For Aircraft Designers

➤ **AIRCRAFT** designers who use metals will find much help in a new and revised edition of a publication of the Civil Aeronautics Administration just issued, entitled *STRENGTH OF METAL AIRCRAFT ELEMENTS*. It is available from the Superintendent of Documents, in Washington, for \$1.25.

The publication was prepared by a subcommittee on Air Force - Navy - Civil Aircraft Design Criteria of the Munitions Board Aircraft Committee. It is a "one-stop" reference book for metal aircraft designers. The relatively few differences between Air Force, Navy and civil standards are noted in it. These differences are largely concerned with allowable stresses or minimum strength of typical structures.

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ENGINEERING

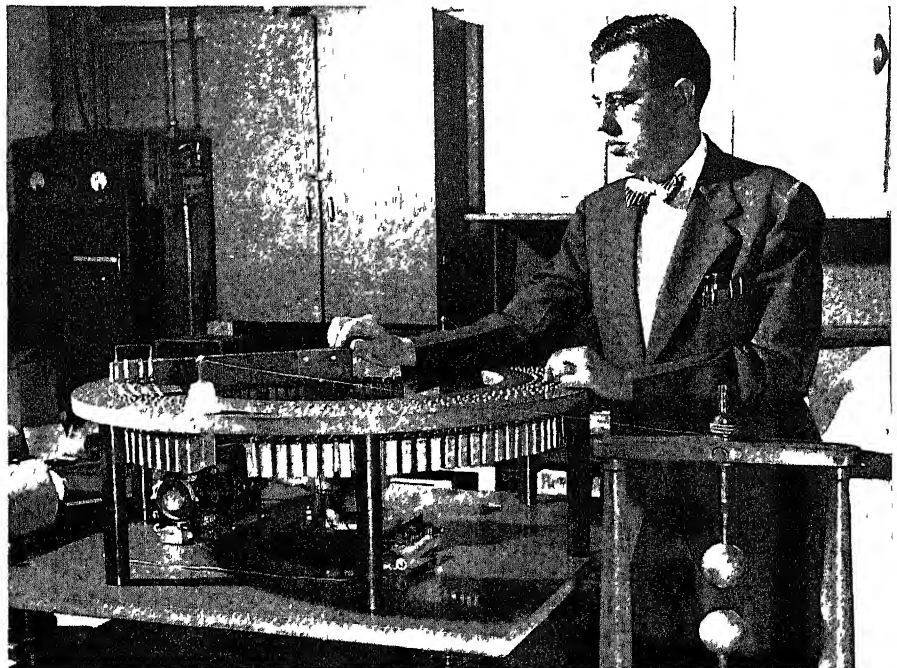
New Instrument Increases Voltage from Generator

➤ **"VOLTAGE multiplier"** is the name of a new laboratory instrument, revealed by General Electric in Schenectady, N. Y., which will increase 100-fold the voltage produced by a small, shop-size generator. It will step up the voltage from a 1,000-volt machine to 100,000 volts.

The instrument is still in a development stage, but may eventually be used in conjunction with X-ray equipment and atom-smashers. As explained by Charles Lemmond, G. E. scientist, it operates on the principle of the old-fashioned water wheel.

While a water wheel develops power as its buckets fill with water, he said, the new voltage multiplier builds up energy by "filling" 100 capacitors with electric charges. Connected in series, the capacitors accumulate energy by picking up their charges through a sweeping arm with "finger-up" brushes.

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VOLTAGE MULTIPLIER—This new device so greatly increases the output from the small generator at the left that current leaps across gap between the two metal spheres at right.

AGRICULTURE

Irrigation Aids Expansion Of Australian Agriculture

➤ IRRIGATION is the answer to the expansion of food production in Australia, S M Wadham, professor of agriculture at the University of Melbourne, told members of the British Association for the Advancement of Science at Newcastle-Upon-Tyne, England

Over 1,000,000 acres are already under irrigation, and 'there is no doubt as to the ultimate capacity for an expansion of production, the limits of which can scarcely be described,' Prof Wadham stated

The limit to this expansion will be set by the availability of water at a reasonable cost, and by other technical and economic considerations, Prof Wadham said

'From 150,000 acres of irrigated orchard and vineyard come produce for the largest part of the country's production of dried and canned fruit, most of which is exported,' he continued

The rice needs of 8,000,000 people are taken care of by irrigated areas. The fodder and hay for the dairy and lamb industries come from irrigated areas, and on irrigated pastures themselves graze the best dairy herds and fattest lambs

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ICHTHYOLOGY

Big, Meaty Cod Feature Bering Sea Fishing Ground

➤ A NEW fishing ground, featuring meaty, 20-pound cod, has been discovered by U S Fish and Wildlife Service investigators off the west coast of Alaska

Despite encouraging reports of hauls made in the Bering Sea from Norton Sound to the southern end of Nunivak Island, the area is not without its perils, a preliminary report indicated. Cold currents from the Siberian side of the Sea were blamed for many unproductive drags and such hazards as ice-borne boulders and coral-like formations, which snagged and damaged trawls

But the promising catch of cod and flatfish makes the area worth further study which it will get, Service officials said

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AERONAUTICS

Disposable Oxygen Mask For Emergencies in Flying

➤ INEXPENSIVE, disposable oxygen masks for airplane passengers in emergencies when a plane rises to unexpected high altitudes to pass over a storm, were revealed at the Wright-Patterson Air Force Base where they were developed. Because never re-used, they will never require sterilization

The mask is designed for use with standard constant-flow oxygen equipment and

no changes will be required in aircraft interiors to accommodate the new device. Essentially, it consists of a porous paper face piece, a bellows fashioned of very thin plexiglass, and a plastic tubing which connects with the plane's oxygen supply. As the wearer breathes in oxygen, the bellows expands and contracts and the gases he exhales escape through the porous paper

Early tests on the disposable mask, which engineers estimate will perform satisfactorily for four or five hours, were carried out in conjunction with the University of Washington. The mask is expected to be effective at altitudes up to 25,000 feet, but not to be satisfactory at higher levels

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MEDICINE

New Sulfa Drug Aids Chronic Intestinal Ailment

➤ DOCTORS now have a new medicine which is effective against chronic ulcerative colitis, described as one of the "most dreadful and unpredictable diseases of the abdomen known to medical science"

It is a member of the sulfa drug family and is called nisulfazole. Announcement to the medical profession of its placement on the market was made by J G Jordan, president of George A Brien & Co, Kansas City, Mo., manufacturer of the drug

The sulfa drug's effectiveness in controlling symptoms of the disease was discovered in studies conducted by the company's research laboratories and by Dr Ralph H Major of the University of Kansas Medical School. These results have subsequently been confirmed by other investigators

The favorable results are believed mostly due to nisulfazole's suppressing the increased supply of the enzyme, lysozyme, found in the gastrointestinal tract, and to its action in arresting the growth of bacteria

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MEDICINE

High Blood Pressure Is Field of New Journal

➤ HIGH blood pressure and related circulatory diseases will have their own medical journal beginning early next year. *ANGIOLOGY* is the title of the new journal devoted to "peripheral vascular diseases"

Medical articles to be published in this journal will cover the group of diseases that now rank first as the cause of death in the United States. Arteriosclerosis, commonly called hardening of the arteries, and Reynaud's disease are included in such blood vessel disturbances. They are much more prevalent now that more people live longer and reach old age

Dr Saul S Samuels of the Stuyvesant Polyclinic in New York City will be editor-in-chief

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VETERINARY MEDICINE

Barren Cows May Give Milk Thanks to Sex Hormone

➤ A WORLD without bulls, thanks to the power of a synthetic female hormone to induce milk production in virgin heifers and barren cows, is on its way

"The first stage in making the male redundant," in the dairy world at least, has been taken, Sir John Russell, director of Rothamsted experimental station, declared in his presidential address before the British Association for the Advancement of Science, Newcastle-Upon-Tyne, England

Lactation was induced in the virgin heifers and barren cows by buying tablets of the synthetic female hormone, diethylstilbestrol, under the animals' skin. This is the same synthetic chemical which brings relief of hot flashes and other symptoms to many middle-aged women

Richer milk and more of it can be produced by injections under the cow's skin of another hormone chemical, thyroxine, from the thyroid gland. Dr H D Kay, of the Dairy Research Institute, Shinfield, England, has found, Sir John reported, that injections of thyroxine or feedings of iodinated milk protein (casein) increased the fat content of milk and raised the yield up to 20% after the peak of milk production was passed

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ENGINEERING

Quick Temperature Change Used in New Metal Process

➤ FIVE seconds only are required to temper a metal surface in an electronic heating process revealed by General Electric in Philadelphia. It was developed by engineers in the company's switchgear division

In this short interval a metal surface is heated from room temperature to 1,600 degrees Fahrenheit and cooled again to ordinary temperature. The process is particularly for small metal parts and is employed to harden the toothed surfaces of small ratchet wheels for automatic circuit reclosers

The process uses an electromagnet which holds the part to be tempered within the field of a powerful electronic heater. As soon as the part has been heated to the proper temperature, an automatic switch shuts off the heater and also the current from the electromagnet, and the part drops into a cooling bath of oil.

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ANTHROPOLOGY

Old Piltdown Man Is Only About 10,000 Years Old

➤ FAMOUS Piltdown man, long considered one of mankind's oldest ancestors, is a mere anthropological infant, not more than 10,000 years old, Dr. K. P. Oakley of the British Museum disclosed to the British Association for the Advancement of Science at Newcastle-Upon-Tyne, England.

Previously considered to be between 100,000 and 500,000 years old, the jawbone and skull are now proved by analysis of their fluorine content to be definitely of the last interglacial period.

Fossil animal bones of known geological age, dating from the Pleistocene or glacial period, unearthed nearby the human bones at Piltdown, England, had the same content of the chemical fluorine picked up from the groundwater of the locality.

Dr. Oakley exploded the attractive idea of modern man being descended from the Piltdown man, also known as Eoanthropus, the Dawn Man. A long controversy over whether the skull and the jawbone were from the same individual seems to have been settled also, as they both have the same fluorine content. Some experts held that the skull was that of a relatively recent man and the jawbone of an ancient anthropoid.

England still claims an ancient human ancestor. The Swanscombe skull was given the fluorine test and pronounced Middle Pleistocene, about 60,000 years old, and probably Britain's earliest man. But in China, Java and perhaps Africa, man-like creatures lived earlier.

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ASTRONOMY

Dim Stars Discovered Broadcasting Radio Waves

➤ DIM stars are broadcasting to the earth a short-wave radio noise that has been received with special antenna, the British Association for the Advancement of Science was told in Newcastle-Upon-Tyne, England, by Dr. F. G. Smith, Cambridge, expert in radio astronomy.

The "broadcasting stations" producing these four-meter waves are thought to be stars with dim surfaces, hard to see. They are about as far away as the nearest known visible stars, and distributed over the sky about the same way as stars giving off light.

Two major sources for these radio signals have been discovered in the Northern sky, and 23 smaller ones have been discovered. None of these corresponds to

bright visual stars. The major sources are not stars brighter than eighth magnitude, too faint to be seen with the naked eye.

The radio stars are about as big as ordinary visual stars, as judged by a study of fluctuations of the signals received. The elections in the stars producing signals have a motion corresponding to at least 10,000,000,000 electron volts and the temperature is about 10,000,000,000 degrees.

These immense energies suggest to Dr. Smith that the mysterious cosmic rays may originate in the same stars that give rise to the radio waves he has observed.

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GENERAL SCIENCE

Scientist's Nomination Held Up by Investigation

➤ BECAUSE of anti-capitalistic and pro-communistic statements he is reported to have made at a Moscow "peace conference," the British Association for the Advancement of Science has deferred nominating Prof. J. D. Bernal, University of London crystallographer, to its governing council.

Prof. Bernal is to be asked to reiterate his actual Moscow statements. Press reports stated that he accused capitalism of trying to enslave science in the interests of war. He is reported to have told the Moscow meeting that "soon in the United States no one who has not been an inveterate enemy of the Soviet Union will be allowed to teach or engage in scientific research."

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CHEMISTRY

Land Yields More Uranium Than Ocean Water

➤ AMERICAN experts in Washington see no practical possibility of getting uranium, raw material for the atomic bomb, out of sea water.

Scientists have known for over a decade that the sea does contain uranium as well as other radioactive elements. There is, however, much less uranium in sea water than in the same amount of ordinary earth, although it might be easier to get it out of water than out of earth. Magnesium is mined from the sea commercially.

Discussion of the possibility of getting uranium from the sea arose from a speech of Dr. Hans Pettersson of Sweden to the British Association for the Advancement of Science at Newcastle-Upon-Tyne, England.

He stated that the uranium content in sea water is fairly constant, varying between limits of one to two micrograms per liter, with a slight tendency to increase at great depths. A microgram is one one-millionth of a gram, and a liter is about the same as a liquid quart. (An ordinary dime weighs about two grams.)

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BIOCHEMISTRY

Action of Deadly Poison Seen as Jamming Cell Cycle

➤ FLUOROACETATE, a rat poison better known by its war secret name of 1080, acts to "jam the cycle" of cell chemistry in its killing course.

This new theory of the poison's action with the latest research on which it is based were announced at the meeting of the British Association for the Advancement of Science at Newcastle-Upon-Tyne, England, by Prof. R. A. Peters of Oxford University.

No antidote for 1080, or fluoroacetate, has yet been discovered. Prof. Peters and colleagues, however, are the scientists who discovered the antidote for arsenic and mercury poisoning, known as British anti-lewisite, or BAL. The war gas, lewisite, is an arsenic compound. Discovery of its antidote was made through fundamental biochemical studies similar to those Prof. Peters is now making on the action of fluoroacetate.

The chemical cycle which fluoroacetate "jams" is known as the tricarboxylic cycle. It is a reaction involved in the breakdown of sugar, and goes on in a cycle.

Fluoroacetate gets into the cycle, and is poisonous, because it is so like an acetate chemical normally formed during the cycle that the body's enzyme for handling the normal acetate cannot distinguish between the normal one and the fluoroacetate.

The chemical result is an accumulation of citrate to 56 times the amount normally found in kidney tissue, and 26 times the amount normally found in the heart. Why this accumulation of citrate is poisonous is not yet known.

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ENTOMOLOGY

Insects Invade England On Warm Air Currents

➤ ENGLAND is being invaded from the Continent. Insect pests, carried by warm air currents and winds, are drifting across the southern North Sea and the English Channel.

At the British Association for the Advancement of Science meeting at Newcastle-Upon-Tyne, A. C. Hardy, professor of zoology and comparative anatomy at the University of Oxford, reported that large groups of small insects, particularly aphids, are known to stay in the air an average of 15 hours, or 246 miles.

The floating insects are caught in four-foot nets at mast heights on ships which are over 100 miles from the coast. Knowing the time and place where the bugs are caught, their time in the air and the distance traveled are computed mathematically from known winds.

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GENERAL SCIENCE

Clubwork Makes Science Fun

Most of tomorrow's scientists start with Science Clubs of America, probably the largest scientific group in the world. It serves as a proving ground.

By MARGARET E. PATTERSON

➤ANY one of the thrud of a million boys and girls in Science Clubs of America will tell you science is fun!

"Especially," they add, "if you can do it with other kids."

If you'd like to ask some of these 10- to 20-year-olds why they find science so fascinating, try the nearest school laboratory after school hours. They will be there working, even on Saturdays.

Look for them in basement workshops and attic experimental stations. A barn or a woodshed is a likely place, too.

You may detect their work before you see them.

Track down the source of those strange chemical fumes, odors and explosions. You'll probably find a group of teen-agers concocting a new plastic or synthesizing a new compound.

Spot a novel radio "rig" on a roof. Inside you're likely to find a group of "hams" comparing notes on hook-ups, circuits, code call letters.

Follow the next flight of model planes you see. The youthful designers will be on the ground comparing notes on wing surfaces, gas motors, radio controls.

Or find the owners of that back yard menagerie. The white mice may belong to a boy who plans to be a doctor, the reptiles to a future zoologist, the hamsters to a girl who wants to be a biologist when she grows up.

Clubs Total 15,000

You'll find these groups of young scientists all over the nation, and in foreign countries, too. There are 15,000 science clubs in this country and abroad affiliated with Science Clubs of America. It is probably the largest scientific group in the world.

A widespread liking for science is engendered by the natural inquisitiveness of youth combined with the intensely scientific flavor of our times. Tremendous impetus for this group effort in science has stemmed from the organization of Science Clubs of America in 1941. It now enrolls most of those who will be our scientists of tomorrow. It also serves thousands of youngsters who have no desire to be professional scientists but are keen about science as a hobby or an avocation. As the citizens of tomorrow they will have a real appreciation of the role science is playing and a speaking acquaintance with its language and methods. The awe and alarm

with which science is viewed by some of their elders is foreign to these well-informed youngsters.

What a science club does depends upon the age and interests of the members and the assistance of the adult who acts as sponsor.

If the members are very young, they are apt to do a great deal of collecting: sea shells, leaves, rocks, minerals, insects, stamps, pets, pictures, bird's nests or any of dozens of other combinations. Singly or in groups they track down or trade for additions to their collections. They arrange their treasures in neat boxes, carefully lettered scrap books or flashy exhibits. They dig into the books that can help them identify their finds and are alert to every chance to "swap" or exchange—by the piece or by the collection.

Among junior high school age students, the interests are usually general. There may be as many interests as members—or even more as each may have a long string of

hobbies he is riding at the same time.

Everything is subject to their curiosity. Individually or collectively the members may turn almost overnight from insect collecting to crystal growing, from building terraria and aquaria to glass blowing, from tropical fish breeding to scientific crime detection, from microscope studies to stuffing animals. Somewhere along the line they all, girls and boys alike, specialize in noisy, smelly chemical experiments.

Absorb Information

Junior high science club members absorb great blocks of information from one another. They shed or take on a new field of science interest as effortlessly as they might take off or put on a coat. They keep voluminous notes on observations of the weather, breeding experiments, dissections, bird migrations. They exchange complicated diagrams and plans, often understandable only to them. Books, magazines, correspondence and endless conferences with their chums are essential to quench the thirst for knowledge about their current interest.

Senior high school age members of science clubs have decided interests for such fields as astronomy, electronics, embryology,



PRIVATE PROJECT—Science club projects range from the home living room to public exhibits: 15-year-old John Lankford, Washington, D. C., has his astronomical equipment set up in the living room of his home.



GROUP PROJECT—Science club work is generally done by groups such as this one of youngsters studying taxidermy at the Los Angeles County Museum.

microscopy, etc., and join others who share their interest.

Students this age show the effect of the collecting and observation most of them have experienced in their earlier years. By sampling many fields they have discovered their likes and aptitudes and have begun to center their interests on fewer or even on one science. Generally by this time they know whether they like best to deal with living or non-living materials, whether they prefer biological or physical sciences.

Club Is Proving Ground

Science club members spend much time considering their future in science, and, if they are serious about it as a profession, they plan for careers in medicine, chemistry, physics, engineering, zoology, astronomy, mathematics or other fields according to how they feel about the experiences they have had in their clubs with dissection, chemicals, machinery, motors, microscopes, telescopes, slide rules, etc. The club serves as a proving ground at this stage, and many a youngster has thus saved himself years of time by finding out at this age what he does and does not want to do in science.

Reading is wider and more carefully planned, their records more accurately kept, their conclusions more soundly made and they seek the help of educators and scientists who can direct their new-found enthusiasms about science.

Like all organizations science clubs must deal with their business during the meetings, but this is usually dispensed with quickly and the members hurry on to the program.

The program may consist of a work session with each member carrying on his particular experimental study or it may be a demonstration of the work of one or several to the rest of the club. Sometime during the year each member thus gets a chance to "perform" and the exchange of information is considerable especially in the question periods that follow the "lectures."

Another popular type of program is given by a guest speaker who is invited to appear before the club to explain his specialty. He may be a local scientist, engineer or hobbyist. Occasionally it is an "alumnus" who returns to the club to report on his career's work. Always there are lively and extended question periods after the talk and many a guest speaker has come away limp from the number and diversity of difficult questions the members have fired at him. The public is often invited to these special meetings and parents especially find them stimulating.

Report on Reading

Clubs like to keep up with what is new in science and find a handy way to do it is to have each member report on his current reading briefly at rollcall time.

They feel a responsibility toward the school in keeping them up-to-date in science, too, and achieve this by maintaining a question box or running a "question of the week" feature on a bulletin board. Many clubs have permanent science exhibits like natural history museums or display cases which they change from week to week for all students to enjoy. They are often called upon to put on school assemblies

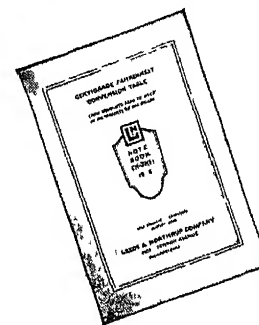
and find that the magic type of chemical show is a sure hit with the student body. Occasionally they get serious about these programs and give their fellow students a half-hour or hour of real science.

A publication—weekly, monthly or quarterly—is achieved by some clubs. If there is enough money in the treasury this can be printed, but less affluent clubs settle for mimeographed or other types of duplicated bulletins, which they exchange freely with far away clubs to the benefit of all.

A few clubs have uniforms, usually centering around the emblem of SCA. One club decorated the walls of their quarters with scientific caricatures.

Raising money for the club must be considered. Some can be done with dues, but when large amounts are needed, they run sales of food, sell Christmas cards they have made in their photographic lab, contract for magic shows, make and sell scientific equipment, or devise some other scheme for raising needed funds.

Meeting other clubs with similar or different interests is a goal toward which all clubs work. If they are close enough to others they exchange programs and socialize afterward. Most of them belong to some regional or state organization such as a Junior Academy of Science and thus get a chance to attend a meeting with all



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other clubs in that area once or twice a year

Science Fairs are attracting more and more clubs. In 1949 these huge showings of the work of science clubs in a locality were held in such places at Atlanta, St. Louis, Washington, D. C., Pittsburgh, Philadelphia, Boston, Providence and in Buffalo, Oneonta and Potsdam, New York. One Fair had 1,400 individual entries this year. The Fairs run from three days to 10 days and are visited by thousands of adults, who are often amazed at the scope of science interests and abilities among young people.

High spot in the year for those clubs having high school seniors is the annual Science Talent Search for the Westinghouse Science Scholarships, conducted each year by Science Clubs of America. From the 16,000 boys and girls who enter, 300 are chosen for honors in this stiff competition which requires a three-hour aptitude examination, scholastic and personal records and a 1,000-word essay on "My Scientific Project." Each of the 300 is recommended to the college or university of his choice and most receive scholarships or other financial assistance that will assure them a chance to carry on their education in science.

Out of the 300 a total of 40 are invited

to Washington, D. C., for the five-day, all-expenses-paid Science Talent Institute. Here they learn of the latest developments in science, meet famous scientists, visit places of scientific interest and are awarded scholarships ranging in size from \$100 to \$2,800. Every club aspires to have a winner or honorable mention in this competition and many make this one of the major goals of their whole year's program.

Every school that places a winner receives a plaque to hang in their club quarters. No school has been able to win one of these each of the eight years of the competition but some can boast several. The whole school celebrates when it is honored in

the Search, and some have even granted half or whole day holidays when their winner returns from the Institute after being named the best boy or girl scientist in the USA.

Organizations of scientists in 15 states cooperated with SCA in 1949 to hold state Science Talent Searches and thus were able to honor other outstanding young scientists within those states with scholarships or cash awards to further their science education.

For information about any of the activities of Science Clubs of America write to Science Service, 1719 N. St., N. W., Washington 6, D. C.

Science News Letter, September 17, 1949

METEOROLOGY

Hurricane Forecasting

➤ THE path to be followed and the probable damage to be done by hurricanes cannot yet be predicted with accuracy, but much progress in hurricane forecasting has been made in the past few years.

Because of the severe annual loss of life and property on Gulf Coast and Atlantic Seaboard regions, the U. S. Weather Bureau is giving particular study to the subject. Thirty-hour warning is now fairly reliable. These forecasts are from experienced weather men whose predictions are made on the basis of knowledge of a present hurricane and knowledge obtained by a fundamental study of hurricane movements of the past.

Cooperating with the Weather Bureau in hurricane studies is the Weather Service of the U. S. Air Force. Daring pilots of Air Force planes, with recording instruments and Weather Bureau observers abroad, have penetrated deep into the outer fringes of these gigantic tropical storms. The result is a better knowledge of air movements in a hurricane, and air movements preceding the storm, which are useful to a certain degree, in forecasting.

Of great assistance also, are radio reports from ships at sea and from aircraft over the ocean. Radiosonde, balloon-borne instruments carried high above the earth, is playing an important part. The instrument sends constant weather data to the earth below by automatic radio signals.

There are hurricanes in many parts of the world, although they are known by different names. In the western North Pacific, they are called typhoons. In the northern Indian Ocean, they are known as cyclones, and in Australia as willy-willies. All, however, are tropical storms which originate close to, but not over, the equator.

The hurricane season in America is the late summer and early fall. The storms differ in violence and also in the distance they travel. Many of them hit the coast in the general Florida region, some travel-

ing up the coast, and others crossing the peninsula to appear soon in coastal regions of the Gulf states.

The violent hurricane of 1944 that caused millions of dollars damage in the New England states, and the perhaps equally violent storm of 1947 that crossed Florida and into Louisiana, might be cited as examples. The latter took 61 lives and caused a property loss of \$110,000,000. These two are the worst American hurricanes of the present forties.

During a 25-year period from 1917 to 1941, some 4,200 persons in the United States lost their lives by hurricanes, and there has been 74 fatalities since. Property damage since 1917 is estimated at about \$800,000,000. The New England damage from the hurricane of 1938 was perhaps \$250,000,000. This is said to be one of the most destructive storms in all history.

Science News Letter, September 17, 1949

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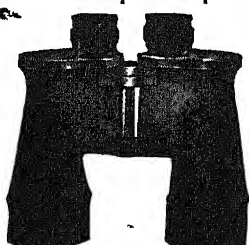
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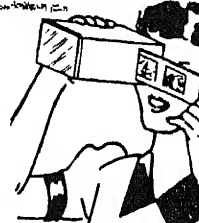
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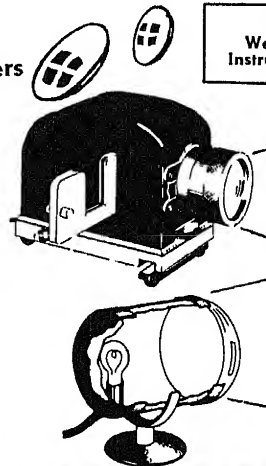
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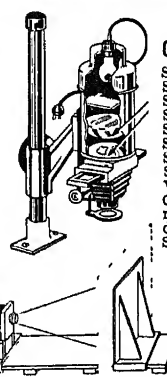
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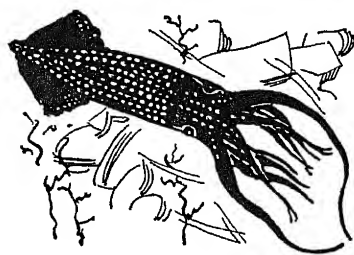
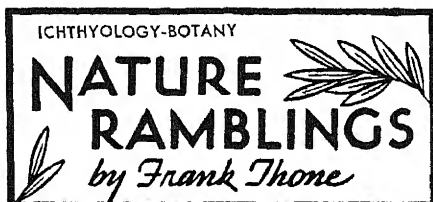
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Natural Inventions

➤ MAN'S invincible egotism is reflected in the names he gives to natural objects and structures which his own mechanical inventions chance to resemble. If someone mentions a pitcher-plant, or a hammerhead shark, or a shoebill stork, we all conjure up a vision of the fantastic creature at once, and think how aptly it was named—disregarding the fact that these things existed long before any human being had contrived a pitcher, or a hammer, or a shoe, or any other artifact, long before human beings were on the scene at all.

Fish and other sea creatures seem to have been especial victims of this tendency of man to play the part of a god and make things, not in his own image, but the image of his handiwork. Thus we have such names as sawfish, swordfish, pipefish, filefish, ribbonfish, threadfish, swordtail, sailfish, gaftops' catfish, and a hundred others. Sometimes they are named not for their actual appearance but for the fancied resemblance of their activities to our own, as in the fiddler crab, angler-fish, archerfish,

diurnfish. One such naming seems to be justified: inkfish. Men use the dark fluid secreted by this squid (which is not a real fish) for ink; its brown tint is known in the water-colorist's box by the mollusk's zoological name *Sepia*.

Fish are not the only examples of this tendency to name natural things for artificial objects or activities. Plants, especially wild-flowers, come in for a lot of it. Consider bottle tree, barrel cactus, organ-pipe cactus, Indian paintbrush, Indian pipe, lady's slipper, Venus' flytrap, Venus' mirror, Solomon's seal, Dutchman's breeches, trumpet-flower, pincushion flower, Spanish bayonet, silversword, swordgrass, sawgrass, chain fern, shield fern, sword fern, cannonball tree, bell-flower, sciew palm, sword bean, knife bean, inkberry, telegraph plant.

Sometimes a shape will reflect itself in half-a-dozen names. There's a whole set of cups for example: buttercup, creamcup, cupweed, leathercup, deathcup mushroom. Or a particular texture will sponsor several plants: silk-oak, satinwood, velvet-leaf.

In a few cases, the process has been reversed, and man acknowledges his debt. Such names may recognize merely chance or fanciful resemblances, such as a carpenter's horse or catheads on a ship or fire-dogs on the hearth or wormgears in machinery. Or they may show a definite tendency for man to study the works of nature and profit thereby.

(A reprint from SNL, Oct. 16, 1943.)

Science News Letter, September 17, 1949

PSYCHOLOGY

Rats Bewildered First Time They Feel Hunger

➤ RATS that are very hungry for the first time do not know what to do about it.

This was found in an experiment with 12 albino rats tested by Dr. Keith J. Hayes, of the Yerkes Laboratories of Primate Biology. He reported results to the meeting of the American Psychological Association in Denver, Colo.

Seven thirsty rats learned to run straight down an alleyway to reach water in a box through a trap door at the end of the alley. Each time they made the run they had to climb over a heap of food in a pan halfway down the runway.

For five hungry rats the experiment was reversed. They learned to run down the alley to find food and half way down the runway they waded through water in a pan. Later the thirsty rats who had run over the food to get to their water were made very hungry and put into the alleyway. They did not stop to eat when they came to the food, but ran right on according to their habit. When they got to the box at the end, some of them tasted the water, but did not actually drink. After a few runs, most of them stopped at the food pan, but ate only a little. Some took pieces of food through the trap door to eat it there.

By contrast, the rats who had been hungry during learning and had waded through water on their way to food, stopped to drink when they went down the alley thirsty. They did this on the very first trial.

No explanation was offered by Dr. Hayes of why the rats know what to do the first time they are very thirsty, but ignore the food the first time they feel hungry.

Science News Letter, September 17, 1949

PSYCHOLOGY

Businessmen Gain by Increasing Reading Speed

➤ IT PAYS for business executives of above average reading ability to take a training course in reading, Carol S. Bellows, a psychological counselor of Grosse Pointe Park, Mich., told the meeting of the American Psychological Association in Denver, Colo.

Mrs. Bellows bases this conclusion on what happened when several groups of executive personnel from two industrial plants and a bank took a 10-week course of one and a half hour training periods.

At the beginning, these executives read at about 275 words a minute. In comprehension of what they read, they scored as well as 45 per cent of college seniors.

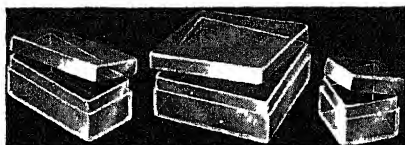
By the end of the 10-week course, they had gained 175 words per minute in speed, now reading at the average rate of 450 words a minute. In comprehension they scored as well as or better than 70 per cent of college seniors.

The course included discussion of various reading skills and practice in their application as well as use of the Harvard reading films as a pacing device.

It pays to take such a course, Mrs. Bellows concludes, because "there is probably a significant saving in time for the business or industrial executive who increases his rate even as little as 50 words a minute."

Science News Letter, September 17, 1949

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It means away from the center. It is centrifugal force that separates the lighter cream from the milk in a separator, and that throws the water out of wet clothing in the "whirl-dry" of the washing machine.

It is centripetal force that holds the earth and the other heavenly bodies in their paths around the sun, or any object in a circular path.

Science News Letter, September 17, 1949

Books of the Week

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THE BIG EX-Mix Ehlich—*Doubleday*, 221 p., \$2.50 A science fiction story which looks into the future of the world when the 200-inch telescope reveals the impending destruction of the world through collision of planets

BIRDS' NESTS A Field Guide—Richard Healdstrom—*Washburn*, 128 p., illus., \$2.75 This book shows you how to match the nest with the bird that built it. Includes over 300 birds of the United States ranging to the great plains

CHARACTERISTICS OF RESIDUAL INSECTICIDES TOXIC TO THE HOUSE FLY—Willis N. Bruce—*Illinois Natural History Survey*, 32 p., illus., paper, free upon request to publisher, Urbana, Illinois. A report of 14 experiments

COLLEGE BOTANY—Claience J. Hylander and Oran B. Stanley—*Macmillan*, 638 p., illus., \$5.00 A basic course in plant science

THE CONQUEST OF SPACE—Willy Ley and Chesley Bonestell—*Viking*, 160 p., illus., \$3.95 Many of Bonestell's famous astronomical paintings are brought together with a short text by Ley on our advancements in the field. For both the layman and the professional man

DRAINAGE EVOLUTION IN THE APPALACHIANS OF PENNSYLVANIA—Henry D. Thompson—*New York Academy of Sciences*, 62 p., illus., paper, \$1.25 Volume 52, Article 2 advances the hypothesis of progressive piracy and local superposition to account for the drainage

THE STRUCTURE OF THE METROPOLITAN COMMUNITY A Study of Dominance and Subdominance—Don J. Bogue—*University of Michigan Press*, 210 p., illus., \$2.00 A study of the distribution of population by a member of the staff of the Scripps Foundation for Population Research

FATTY ACID ANTIBACTERIALS FROM PLANTS—H. A. Spoehr and others—*Carnegie Institution of Washington*, 67 p., illus., 50 cents paper, 75 cents cloth. Report of a search for antibacterial substances effective against organisms not affected by penicillin

HOW TO COLLECT AND PRESERVE INSECTS—H. H. Ross—*Illinois Natural History Survey*, 59 p., illus., paper 10 cents. For the amateur

as well as the trained entomologist

IRON METABOLISM—A. Vannotti and A. Delichau—*Gruene and Stratton*, 267 p., illus., \$6.50 On how the normal body uses iron and how iron metabolism is affected by disease. First published in German, translated by Edwin Pulay

LIGHT OF LIFE—Louis I. Dublin, Alfred J. Lotka, Mortimer Spiegelman—*Ronald*, 379 p., illus., \$7.00 Life insurance company health statisticians trace the progress in health and longevity from earliest times to the present day

MECHANICS, STATICS AND DYNAMICS—Melitt Scott—*McGraw-Hill*, 394 p., illus., \$4.50 An intermediate-level textbook. Primarily for physics majors on the junior-senior level, to bridge the gap between the first college course and graduate study

OIL AND GAS IN EASTERN KANSAS With Special Reference to Developments from 1944 to 1948—John Mark Jewett—*State Geological Survey of Kansas*, 308 p., illus., paper, 25 cents. A report bringing together much of the scattered data both published and unpublished

THE PHYSICIAN'S BUSINESS—George D. Wolf—*Lippincott*, 3rd ed., 563 p., illus., \$10.00 A reference work on business for the physician. Largely rewritten, with a detailed chart on the establishment of fees

THE PSEUDOSCORPIONS OF ILLINOIS—C. Clayton Hoff—*Illinois Natural History Survey*, illus., paper, 50 cents. Detailed study of a minute animal of the Arachnida class, of which few collections have been made in the past

RAPID MICROCHEMICAL METHODS FOR BLOOD AND CSF EXAMINATIONS—F. Rappaport—*Gruene & Stratton*, 404 p., illus., \$8.75 Containing methods of microchemical and microbiological determination. For the graduate student

THE SCIENTIFIC FILDING OF CHICKENS—Harry W. Titus—*Interstate*, 2nd ed., 253 p., illus., \$2.50 A practical book for poultry raisers

SCORPIONS—Herbert L. Stahnke—*Arizona State College Bookstore*, 23 p., illus., paper, 75 cents. The results of direct research on an animal killer responsible for 68% of all Arizona deaths due to venomous creatures

SILIN (SELENIUM): Gmelin's Handbuch der Anorganischen Chemie—*Gmelin-Verlag*, 8th ed., 195 p., illus., paper, \$16.25 (D. R. Stein) A compilation of the material on selenium including the latest continental advances

SKYSHOOTING Hunting the Stars With Your Camera—R. Newton Mayall and Margaret L. Mayall—*Ronald*, 174 p., illus., \$3.75 Written for anyone with a camera who wants some of the fun of photographing the heavens. Illustrated with beautiful photographs

STATICALLY INDETERMINATE FRAMEWORKS—

Thomas F. Hickerson—*University of North Carolina Press*, 3rd ed., 202 p., illus., \$5.00 A technical book on engineering

SURVEY OF UNIVERSITY BUSINESS AND ECONOMIC RESEARCH PROJECTS—Lyle C. Bryant—*Gov't Printing Office*, 240 p., paper, \$1.00 A guide to current and recently completed research projects, compiled by the Department of Commerce

VERSO DEL SOMBRIERO BLANCO—Albino William Bork—*University of Arizona*, 20 p., paper, 20 cents. A collection of "coplas" or verses which have been sung and recited in the Spanish folklore of Old and New World for centuries. Collected by the Patagonia Union High School in Santa Cruz County, Arizona

Science News Letter, September 17, 1949

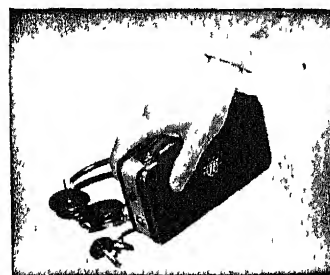
On This Week's Cover

➤ A FIERCE-LOOKING fly which looks more like a wasp, bumblebee or moth, the robber fly is a strange relative of ordinary two-winged flies

Robber flies can and will eat honeybees and even bumblebees. But their diet also includes gnats, mosquitoes and other flies. Thus, while more formidable than the house fly, the robber fly is regarded as being generally beneficial.

Science News Letter, September 17, 1949

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☛ **LONG-LASTING KNIFE** blades, guaranteed to need no sharpening for at least three years, are made of stainless steel by a high-temperature, deep-freezing process. The blades are first heated to a temperature below the melting point, quenched in oil, put in a chamber at low sub-zero temperatures, then tempered.

Science News Letter, September 17, 1949

☛ **INSULATING TAPE**, for electrical applications by vulcanizing, is made of glass fiber impregnated with a rubber-like dielectric on both sides. On one side of the tape, the rubber is completely cured but on the other is semi-cured only. When heat is applied the total becomes a solid mass.

Science News Letter, September 17, 1949

☛ **SLEEVE FORM**, for use in pressing coats without leaving a lengthwise crease in the sleeve, consists of two slightly curved pieces of wood to insert into the length of the sleeve. After insertion, the wood pieces are spread apart by an ingenious but simple wire separation and locking device.

Science News Letter, September 17, 1949

☛ **CHRISTMAS-TREE** odor is impregnated in a wrapping paper for Christmas packages, the aroma being of the fir balsam. The wrapping paper is available in various colors, and in many designs suitable for the Christmas season.

Science News Letter, September 17, 1949



☛ **CHROMATIC ACCORDION**, shown in the picture, is made of a styrene plastic and is suitable for beginners or accomplished musicians. With this low-cost instrument, beginners can perfect two-hand technique before advancing to the larger, professional-type accordion.

Science News Letter, September 17, 1949

☛ **SPEEDOMETER**, suitable for use on Army tanks and other heavy vehicles used

on roads where there may be a great deal of slippage between the tracks or tires and the road, is mounted on a trailing bicycle wheel which operates a generator, the voltage of which registers on a dial in miles-per-hour.

Science News Letter, September 17, 1949

☛ **TELESCOPIC RIFLE** sight can be changed in magnification by a quarter-turn of a knurled ring near the scope's eyepiece from two and one-fourth to four power. It can be readily shifted from one gun to another without altering focus or eye distance.

Science News Letter, September 17, 1949

☛ **WAXES** for home use, ranging from furniture or automobile to window slides, comes under pressure in a hermetically sealed can and is applied to a spray by man, woman or child, merely by pressing a trigger as with the well-known aerosol insecticide bomb. This long-lasting carnauba wax is "finished" by a light wiping.

Science News Letter, September 17, 1949

☛ **ELECTRIC WIRE**, with a number on every inch of its insulation to correspond with terminals, is designed to eliminate the need for various colored wires, and is for use in any electric control system using more than three wires. It makes for easy, error-proof installation.

Science News Letter, September 17, 1949

Do You Know?

American National Parks are sanctuaries for over 65,000 hoofed animals, and for unestimated thousands of carnivores or flesh-eaters.

Metals possess *super-conductivity* if they offer practically no resistance to an electric current when cooled to some 450 degrees below zero Fahrenheit, 13 such metals are now known.

Ocean currents are said to be responsible for the fact that the *coconut palm* is found on widely separated lands, coastal palms often drop their well-protected fruit in the water and it drifts for many miles.

Musk oxen practically disappeared from Alaska over a century ago, being killed for food, a herd brought from Greenland to Alaska nearly 20 years ago is increasing satisfactorily in spite of their low breeding potentialities.

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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



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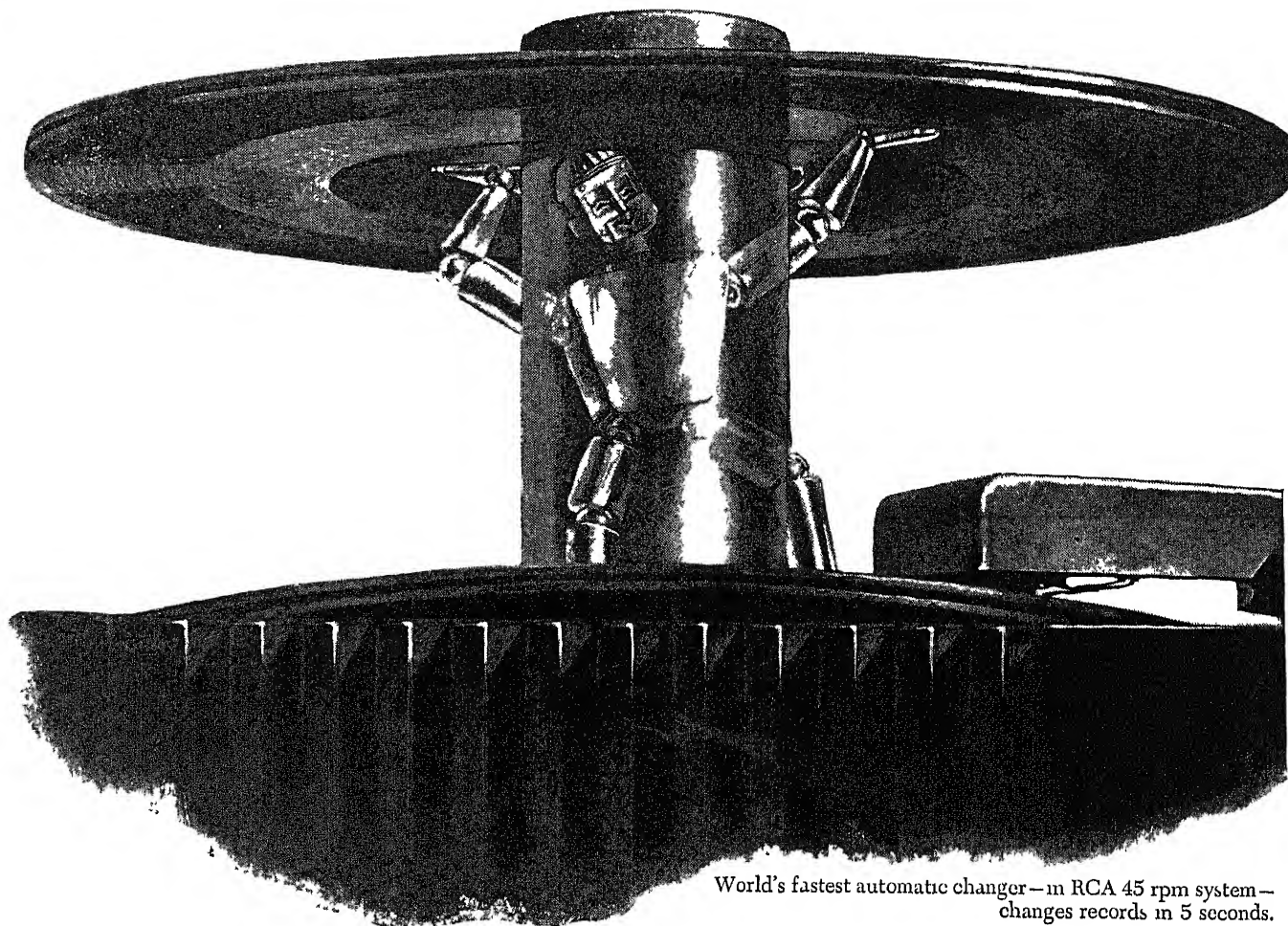
Memory System

See Page 198

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World's fastest automatic changer—in RCA 45 rpm system—changes records in 5 seconds.

Quick change artist

Hundreds of thousands are now enjoying RCA's thrilling new way of playing records—they marvel at its wonderful tone . . . and the speed with which it changes records.

Prolonged research is behind this achievement, research which sought—for the first time in 80 years of phonograph history—a record and automatic player designed for each other.

Revolutionary is its record-changing principle, with mechanism *inside* the

central spindle post on which records are so easily stacked. Result, *a simplified* machine, that changes records in 5 seconds.

Remarkable, too, are the new records—only 6 $\frac{3}{4}$ inches in diameter—yet giving as much playing time as conventional 12-inch records. Unbreakable, these compact vinyl plastic discs use only the distortion-free “quality zone” . . . for unbelievable beauty of tone.

Value of the *research* behind RCA's

45 rpm system—which was started 11 years ago at RCA Laboratories—is seen in the instant acceptance, by the public, of this better way of playing records. Music lovers may now have *both* the 45 rpm system, and the conventional “78.”

* * *

Development of an entirely new record-playing principle is just one of hundreds of ways in which RCA research works for you. Leadership in science and engineering adds value beyond price to any product of RCA, or RCA Victor.



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MEDICINE

New Blood Pressure Ill

Patients with the new high blood pressure disease differ from others in that they have very little salt in their sweat, gain weight suddenly, and may be hairy.

➤ A NEW high blood pressure disease and a sweat salt test for helping to detect it were announced at the meeting of the American Physiological Society in Augusta, Ga.

The name suggested for the new disease is Schroeder's Syndrome, because Dr. Henry A. Schroeder, of Washington University School of Medicine, St. Louis, Mo., first discovered it. Certain patients with high blood pressure, he found, had a set of symptoms, or a syndrome as doctors say, that made them significantly different from most patients with high blood pressure.

One of the important differences is that these patients have less salt in their sweat than other high blood pressure patients and less than the lowest for normal persons. This difference was discovered by Drs. Dean F. Davies and Helen E. Clark of Washington University.

The significance of this sweat salt difference, they pointed out, is that it shows that one group of high blood pressure patients have increased activity of their

adrenal glands. Among many vital activities, these little glands just above each kidney help to regulate salt in the body. In the Schroeder's Syndrome patients, these glands are overactive in keeping salt in the body. Consequently there is less in the sweat.

In spite of many suggestions that these glands play an active part in high blood pressure, there has heretofore been no convincing evidence that they do. The experiments reported show not only overactivity of the glands in one kind of high blood pressure but also, and perhaps equally important, lack of increased activity of these glands in most cases of high blood pressure. The high blood pressure patients who did not fall into the Schroeder's Syndrome group had about the same amount of salt in their sweat as normal persons.

Schroeder's Syndrome patients also differ from other high blood pressure patients in other ways. They are over-fat with the fatness marked in the trunk, arms, thighs and face. They have had a sudden

gain in weight, usually at certain periods such as after pregnancy or at the menopause. And they may be hairy.

Science News Letter, September 24, 1949

PSYCHOLOGY-VETERINARY MEDICINE

Grades Do Not Predict Success in Vet Study

➤ NEITHER high-school nor college grades are a satisfactory indication of what a student will do in a course of veterinary medicine, Dr. William A. Owens, of Iowa State College, has discovered.

Dr. Owens also found that scores on the American Council of Education psychological examination were not good predictors of success in the vet course.

This led Dr. Owens to develop four special tests for selection of students for the course. Two were achievement tests in chemistry and zoology, the most important for the pre-veterinary courses. The other two were tests of aptitude patterned after a standard test of medical aptitude but entirely new and employing representative veterinary content.

Results on these four tests were substantially related to success in the first year of veterinary training.

Dr. Owens described his study at the meeting of the American Psychological Association in Denver, Colo.

Science News Letter, September 24, 1949

BIOCHEMISTRY

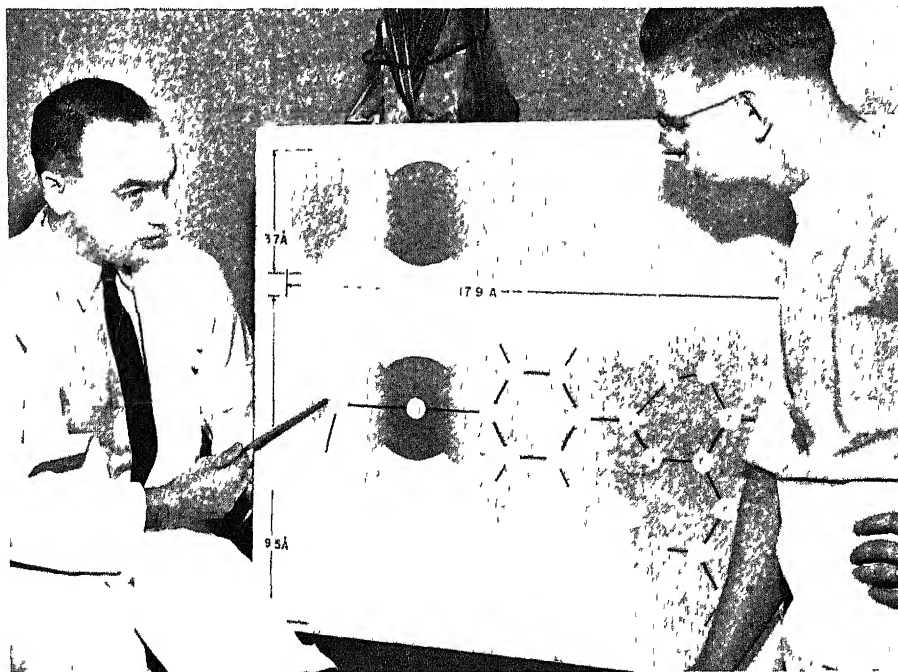
New Compound Can Find Cancer, Muscle Chemicals

➤ CREATION of a new kind of substance for finding chemicals involved in cancer and other chemicals basically responsible for muscle movement was announced by Dr. H. S. Bennett of the University of Washington Medical School in Seattle.

The new substance is a chemical compound that contains mercury. When it combines with a special type of sulfur-containing compound, it signals the sulfur compound's location in red so that the scientist can see where the sulfur chemical is. The particular sulfur chemicals located are ones containing a combination of sulfur and hydrogen known as sulfhydryl. The sulfhydryl combination is important both in muscle functioning and in cancer chemistry.

The new mercury red-signal compound is believed the first chemical ever created to let scientists trace body chemicals by sight. Radioactive chemicals used as tracers or tags for body chemicals signal either by the sound of the Geiger counter or by taking their own picture on an X-ray plate which then must be correlated with the optical picture of the tissue under study.

Science News Letter, September 24, 1949



MERCURY RED-SIGNAL COMPOUND—What is believed to be the first chemical ever created to let scientists trace body chemicals by sight is being explained by Dr. H. S. Bennett, at left, head of the University of Washington anatomy department. This scale drawing of sulfur-containing molecule shows how red mercurial compound acts as a "red flag" when coupled to sulfhydryl group of tissues.

ECONOMICS

Economics Machine-Wise

► THE economic goals of a free democracy are determined by its citizens. If they are to choose intelligently, they have to know what alternatives they have. Giant calculating machines may be able to analyze all of the main alternatives and determine what economic policies are required to reach them. Dr. Frederick V. Waugh, economist of the President's Council of Economic Advisers in Washington, reported to the Symposium on Large Scale Digital Calculating Machinery in Cambridge, Mass.

These "electronic brains" are needed because our economy is complicated and constantly changing. Taxes, farm-support, social security programs all involve a large number of factors and all of them affect each other. The need of throughgoing studies of the economy as a whole, recognized during the industrial mobilization for World War II, was brought into focus by the Employment Act of 1946 which

called upon the Federal Government to promote maximum employment, production and purchasing power.

It is not enough to know the total income or production of the nation. Information about thousands of kinds of goods produced and sold must also be analyzed to find out how they affect the economy.

Much of this information is already being gathered but is not being fully used because analyzing it is too complicated to be done by ordinary statistical methods using small computing machines. When the giant calculating machines are put to work, economists hope to be able to learn much more about our economic problems and what we can do to solve them in different ways.

If economic research can do this, Dr. Waugh stated, Congress and the general public will have a scientific basis for deciding the best solution.

Science News Letter, September 24, 1949

ENGINEERING

Tunnel Gets Gas Detector

► THE 2,000-foot West Rock highway tunnel near New Haven, Conn., on the Wilbur Cross Parkway, U. S. Route 1, will be freed of poisonous carbon monoxide gases from automobile exhausts before they reach harmful concentrations by means of an automatic device now being installed.

The carbon monoxide detecting device, which can detect as little as one part of the deadly, odorless, colorless carbon monoxide gas in 1,000,000 parts of air, is to control the tunnel's ventilating system. It will continuously sample the air from near the tunnel's entrance and, if dangerous amounts of the poison gas are found, turn on venti-

lating fans to deliver fresh air into the tunnel.

In addition, four less elaborate carbon monoxide ventilation controls have been provided, two located along each of the two one-way tunnels, to detect any accumulation of exhaust gases during traffic stoppages or other conditions. They also are capable of starting ventilating fans.

All the instruments operate on the same basic principle. Air to be analyzed is drawn through a cell containing a substance known as "Hopcalite." With this substance acting as a catalyst, the carbon monoxide in the air is burned. Heat liberated is measured

with a sensitive thermopile. The circuit develops electric energy that actuates recording and indicating meters.

The carbon monoxide detecting device is a product of Mine Safety Appliances Company, Pittsburgh. It is similar to those used in the Holland Tunnel under the Hudson River, between New York City and New Jersey, and all the tunnels on the Pennsylvania Turnpike, the state's principal east-west highway.

Science News Letter, September 24, 1949

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Question Box

ECONOMICS

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MATHEMATICS

Why will chance solutions of problems be left to machines? p. 197.

MEDICINE

Finding wood alcohol in a dead body may be a sign of what? p. 201.

How can a new high blood pressure disease be detected? p. 195.

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What support is there for the theory that polio immunity is temporary? p. 199.

PHYSIOLOGY-MATHEMATICS

What would be the drawbacks of making a non-living brain? p. 197.

PUBLIC HEALTH

How has the rise in polio cases been accounted for? p. 204.

VETERINARY MEDICINE

How will it be possible to breed bigger pigs on less feed? p. 204.

MATHEMATICS

Machine Takes A Chance

Mathematicians confronted by complicated problems are using a kind of coin tossing method to get their answer. It is called the Monte Carlo Method of Solution.

➤ WHEN decision of life's little problems becomes just too overwhelming, if you can't decide whether to go home to the wife or to stay out just a little longer with the boys, tossing a coin to decide now puts you in the class with the best high-brow mathematicians who are using the new Monte Carlo Method of Solution.

But if you cheat and don't follow the advice of your coin, then you lose the full advantage of the Method, since it would otherwise guarantee that you would not make the same wrong decision all the time.

The mathematical decisions of what to do next in the midst of calculating a problem in nuclear fission, aerodynamics, or differential equations—especially when set up on a large high-speed computing machine—sometimes become just too complicated for even the skilled mathematician. In cases like this, S. M. Ulam of the Los Alamos Scientific Laboratory, told the Symposium on Large-Scale Digital Calculating Machinery, which met in Cambridge, Mass., a powerful method of procedure is to put the decision up to chance alone, hence

the name "the Monte Carlo Method."

The mathematician knows that his mathematical procedure will correct itself and give the right answer if even a few of the decisions are wholly accurate. He makes the machine use random numbers to make the chance step-by-step decisions. By this procedure, he is assured that his own human failings do not enter into

baffling decisions inadvertently to weight the direction of the solution in a consistently wrong direction.

Random numbers, required in profusion by the Monte Carlo Method, aren't so easy to come by. D. H. Lehmer of the University of California emphasized Systems for computing random numbers may either fall into a repetitive pattern, giving numbers in cycles or the numbers vanish and all zeros appear in their place.

Numbers that you might dream up by yourself aren't good enough either. They might have too many odd numbers, or threes and sevens, to give an unbiased Monte Carlo choice. Machine generation of pseudo-random numbers—numbers that however are random enough to use—can be accomplished, he reported.

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PHYSIOLOGY-MATHEMATICS

Duplicating Human Brain

➤ MAKING a real mechanical brain may be possible, but even if it is able to solve useful problems, it won't be able to think them up. Dr. William F. Crozier, professor of general physiology at Harvard University, speaking at the Harvard Symposium on Large-Scale Calculating Machinery, Cambridge, Mass., warned, however, that we don't know enough about what actually goes on in the human brain to be sure that we can duplicate it. The

very simplest type of judgment, such as deciding whether one noise is louder than another, has been analyzed. This kind of mechanism in the human brain seems to work the same way as man-made devices that measure noise or make the millions of "decisions" in one of the giant electronic calculators.

But if we can build a non-living brain from purely mechanical components which seems to duplicate human thought, we still cannot be sure that it is actually going through the same processes as the human mind, Dr. Crozier stated. He said that it might turn out to be like a "push button" production line which does the same job as a production line run by men but uses very different means. Such a machine would occupy a great deal of space and require a lot of attention, he added.

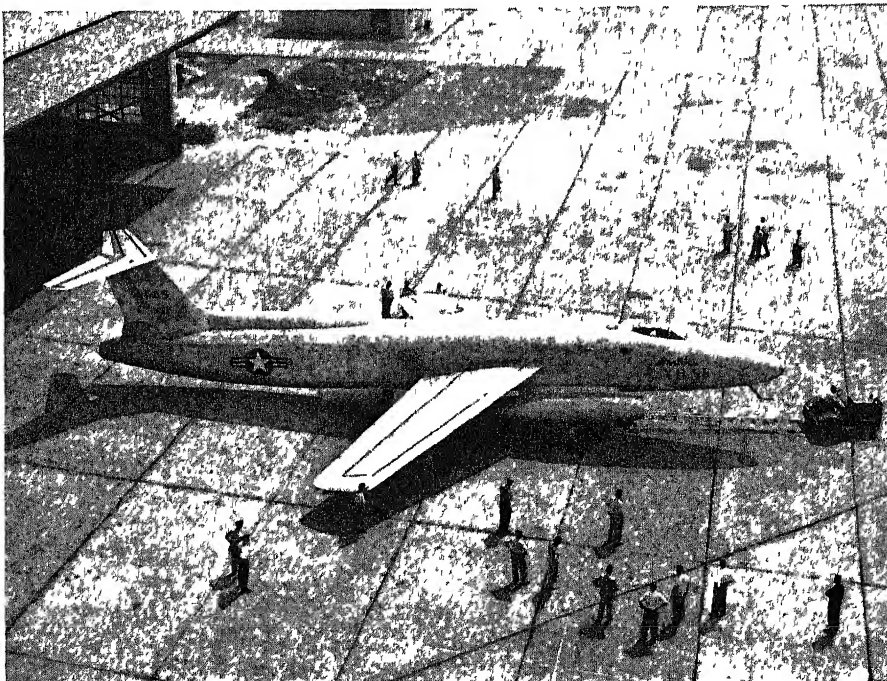
Therefore, although the electronic brains will be useful to physiologists and psychologists in solving many problems, the scientists will be cautious about taking them as models of mental processes. However complex the machines are, Dr. Crozier told the meeting, they will not begin to think up new ideas all by themselves but "will function solely in terms of effects actually (even if sometimes unwittingly) built into them at the start."

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AERONAUTICS

New Three-Jet Plane Will Destroy Ground Targets

➤ THE U. S. Air Force will support the Army Ground Forces with the use of a new plane, the first postwar airplane specifically designed for the destruction of surface targets in cooperation with ground troops, it was revealed by the Glenn L. Martin Company of Baltimore, Md., build-



SPEEDY GROUND-SUPPORT PLANE—This shows the new U. S. Air Force Martin XB-51 with wings that sweep back 35 degrees and three turbo-jet engines for power, two mounted on pylons on the lower sides of the fuselage, the third in the rear of the fuselage.

er of the craft.

The new plane, XB-51, now undergoing ground and taxi tests, is powered by three turbo-jet engines, two mounted on pylons on the lower sides of the fuselage near the cockpit, with the third in the rear of the fuselage. It is the Air Force's first three-jet plane.

The craft, a two-man affair, is about

80 feet long with a wing span of 55 feet. Noteworthy are its thin, high-speed wings, which are swept back at an angle of 35 degrees. The horizontal tail surfaces are likewise swept back at 35 degrees, and are mounted on top of the vertical tail surface. Speed, range and other data are not yet announced.

Science News Letter, September 24, 1949

ment about 30 feet long and 15 feet wide. It weighs close to 10 tons. It utilizes 100 miles of wire, 4,500 vacuum tubes, 3,000 relays and 2,500 magnetic heads and playbacks to carry the information to and from the storage drums. It was constructed under the general supervision of Dr. Howard Aiken, co-inventor of the original Harvard Mark I calculating machine.

Science News Letter, September 24, 1949

MATHEMATICS

Giant Electronic Brains

➤ A HALF dozen giant electronic brains are being used to attempt the solution of some of civilization's major problems, ranging from supersonic flight to the economics of prosperity. Others are being built.

Harvard's third large computing machine, called Mark III, was on display at a Harvard symposium just held, attended by 500 scientists. All-electronic works and magnetic memory are used in this machine. There are, however, many more large scale digital calculators, as they are called.

One of them is actually called the MANIAC, which is a word made of initials like other computers called EDVAC, ORDSAC, BINAC, ENIAC. Other computers built or building are the Bell Laboratories Model VI, the Raytheon computer, the General Electric computer, the National Bureau of Standards computer as well as a Zephyr computer planned for the west coast by the National Bureau of Standards. There are two earlier Harvard machines, Mark I which is an electro-mechanical automatic sequence controlled calculator and the Mark II now solving complicated mathematical problems for the Navy at Dahlgren, Va.

Stubborn problems in mathematical physics, involving atomic energy, cosmic rays, and the nature of matter itself, are being tackled by the new machines. Rocket motors, jet engines and their combustion problems are being solved by the computers. Man's search for oil is being aided. Aeronautical experts are desperately waiting for the electronic brains to untangle the complexities of shock waves and compressibility effects on wings and airplane structures.

Sociological and economic problems will be fed into the giant computers. Dynamic problems of our economic system can be treated by much the same mathematical equations that so safely predict the performance of an aircraft in flight. How economic equilibrium can be attained can be analyzed.

While the United States is leading in the building of giant brains, England has the EDSAC working and a machine called the ACE under construction, and there are machines under construction in Holland, Sweden and Germany.

Science News Letter, September 24, 1949

PSYCHOLOGY

Baby Learning to Talk Follows Development Law

➤ BABIES learning to talk begin to pronounce the vowels, that is, the a, e, i, o, u letters, beginning with those formed with the front part of the mouth and proceeding to those made at the back of the mouth. Dr. Dorothea McCarthy, of Fordham University, has found.

Pronunciation of the other letters of the alphabet, she observed, proceeds in the opposite direction, from the sounds made with the back of the mouth made first and those made with the lips, tongue-tip and teeth last.

These sounds represent increasing control of the tongue and lips and the development of brain control which follows a law of development from the center of the body to the periphery.

Science News Letter, September 24, 1949

PHYSICS

Electronic Brains Must Be Told What To Think

➤ COMPUTING machines, popularly known as electronic brains, have to be told what to think.

Building a giant electronic machine doesn't end the work of the busy mathematician, the scientists who met in Cambridge, Mass., to discuss large-scale digital calculating machinery, were told.

The machines, though highly accurate in doing grade school arithmetic and as fast as an election in operation, are very stupid when it comes to knowing what to do next. Before the button is pressed to start the operation of the machine on solving a problem, every step has to be worked out in advance in a "program."

What a tricky job "programming" is was stressed by D. H. Lehmer of the mathematics department of the University of California.

Because the machine uses its program instructions in sequence, like the freight cars on a railroad track, harassed mathematicians are learning by hard experience some of the rules of shuffling and switching that have been known for a long time in the Kansas City freight yards.

The meeting was sponsored jointly by the U. S. Navy and Harvard University.

Science News Letter, September 24, 1949

MATHEMATICS

Computer Has "Memory"

See Front Cover

➤ DETAILS of an improved high-speed calculating or computing machine were revealed in Cambridge, Mass., its outstanding feature being a "memory system" capable of storing 64,000 digits. It is Harvard University's Mark III, shown on this week's cover of the SCIENCE NEWS LETTER, and will be used by the U. S. Navy Bureau of Ordnance.

The novel memory system combines mechanical, relay and electronic systems. It enables the Mark III to operate 20 times faster than the Mark II, which was completed only two years ago.

The memory system, as explained by a Harvard scientist, consists of eight storage drums and a sequencing drum. Difficult mathematical problems are solved by feeding information on a magnetic tape to the sequencing drum which in turn "commands"

the computing section to accomplish the desired operations with the numbers in the storage drums. Both the information for carrying out operations and the numbers with which the operations are performed are represented by small magnetic spots on the surface of the rapidly rotating drums.

More than 4,000 16-digit numbers, plus 4,000 "commands" for carrying out the various operations of the machine, can be put on these nine drums. They revolve at speeds up to 120 revolutions per second, and the magnetic spots move by the recording and play-back heads at speeds greater than 150 miles per hour.

The computing section of the machine can multiply two 16-digit numbers in a fraction over 12 thousandths of a second. It can add the same two numbers in one-third that time.

Mark III is a bakelite and steel instru-

MEDICINE

Polio Immunity Temporary

Contracting the disease does not leave a permanent immunity, epidemiologist suggests, basing his theory on study of Guam polio-outbreak.

► IMMUNITY to polio, acquired by contracting the infection, may be temporary rather than permanent, as has been supposed.

This is the conclusion of a study made with March of Dimes funds by Dr. W. McD. Hammon, noted epidemiologist in the University of California's Hooper Foundation.

Polio has been classed with the measles and mumps so far as immunity is concerned, the infection in each case bestowing permanent immunity. Dr. Hammon suggests instead that polio may be in the same immunological class as diphtheria and streptococcal infections, in which immunity is transitory.

The scientist bases his theory on accumulating evidence, including his study of a polio outbreak on Guam less than a year ago. At that time polio appeared among the white children of American dependents,

but did not show up among the native Guamanians.

There had never been evidence of polio among the Guamanians, Dr. Hammon said. Why, then, did it not appear among the Guamanian children, who would be presumed to have no immunity?

Tests of the blood of Guamanian children gave the answer when they showed that every child from one to four years of age had been infected with polio at one time or another!

Dr. Hammon's reconstruction of this strange situation is something as follows: In very young children, polio is seldom crippling and usually not severe. So it is probable that polio has always lived underground on Guam. Immunity is acquired very young, the disease passing as a bad cold or similar infection, and is bolstered from time to time by reinfection from the

underground reservoir. So when the disease appeared among the whites, the Guamanians were unaffected.

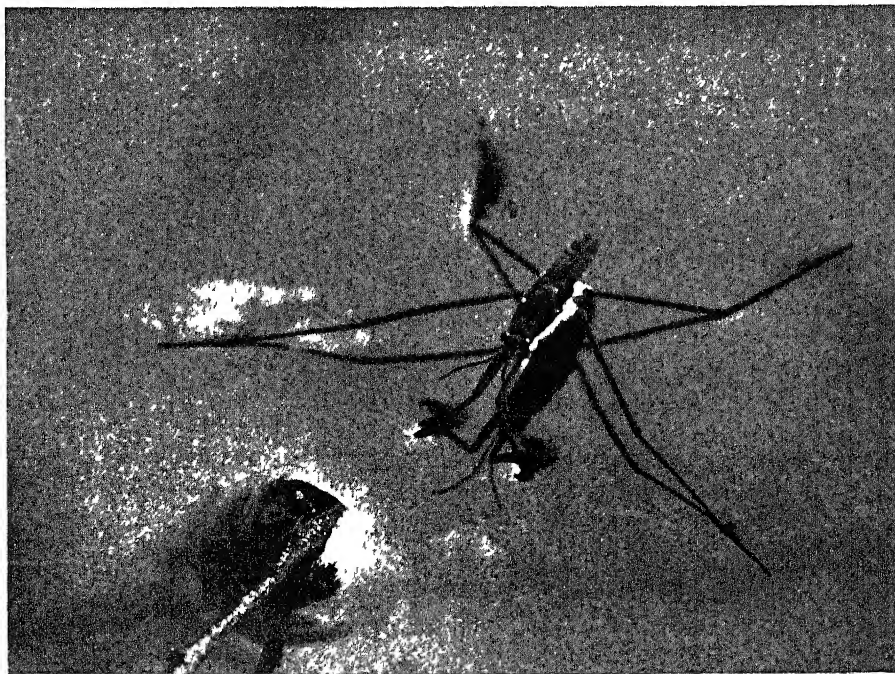
The pattern of polio in this case, Dr. Hammon said, was similar to that of diphtheria and streptococcal infections.

On the other hand, when measles and mumps were reintroduced to the island, all natives—children and adults alike—who had not had the disease were afflicted. Measles and mumps then burned themselves out when everyone had contracted the disease, unlike polio which lives on.

If further evidence proves Dr. Hammon's theory to be true, there will be important public health implications. At the present time persons who are known to have come into contact with polio are not subject to quarantine if blood tests indicate they have previously contracted the disease. If the new theory is true, the "healthy carrier" states will be recognized, and all such persons will be quarantined. This is already recognized in diphtheria and scarlet fever.

The scientist also reported preliminary results of a world-wide survey of ages at which polio is contracted in various parts of the world. Early results indicate that climate influences the age of contraction, the disease appearing earlier in hot climates. On Guam 50% of the children of one year of age had been infected, while in San Francisco 50% were not infected until the age of 11.

Science News Letter, September 24, 1949



WOLF OF THE WATER'S SURFACE—This insect belongs to one of the species of water striders which feasts on dead or living insects which fall on the waters of streams or ponds where he lives. The ripples made on the water by a struggling insect instantly attract him. The water strider can skate along the water without breaking the surface film because his hairy legs are not wetted, just as a greased needle will float on water. He goes about on his two hind pairs of legs, pushing with the middle pair, steering with the last, and holding the front pair up so as to be ready to grasp his prey.

GEOLOGY

Ocean Water Penetrating Underground in California

► SALT-water contamination appearing underground in the deep soil in coastal parts of Orange County, Calif., is the subject of a brief report issued by the U. S. Geological Survey. The below-surface infiltration of the ocean water is due to heavy pumping of normal underground fresh water for domestic and irrigation purposes.

Subnormal ground-water recharge also is in part responsible, the report indicates, in producing a continued inland advance of ocean water into the Recent and, to a lesser extent, into the Pleistocene deposits underlying the coastal lands, especially those in Santa Ana Gap. Since 1944 several irrigation and public-supply wells in this area have been abandoned because the pumped water became too brackish.

The report as yet is only in typewritten form but is to be duplicated soon for release to the public. Typed copies, however, are available for examination in Washington and at Geological Survey offices in Sacramento and Long Beach, Calif. They are also at the Santa Ana office of the Orange County Water District and that of the County Flood Control District, two agencies which cooperated with the government in the saline contamination survey.

Science News Letter, September 24, 1949

MEDICINE

Ant Bites Produce Collapse in Patient

➤ **WITHIN** a few minutes of feeling ant bites, a soldier broke out in a rash and his eyes swelled almost shut. The reaction was so severe that he had to be helped to the hospital in a state of near collapse.

The case of the man who nearly succumbed in a state of shock to the bite of ants is reported by Col Charles H. Morhouse, surgeon in the Medical Corps of the U. S. Air Force, Randolph Field, Texas, to the *JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION* (Sept. 17).

By showering the patient the ants were removed and he was given oxygen to aid his breathing. Epinephrine, which stimulates the heart and relieves allergic symptoms, gave him little relief so it was necessary to give him two other drugs, the anti-allergy pyribenzamine and the local anesthetic, procaine hydrochloride, before his symptoms were relieved.

Col Morhouse believes that either drug might have given relief but the patient's condition was so serious that it was impossible to wait to see if the pyribenzamine was effective.

At the end of two hours the rash had disappeared and the patient slept comfortably until evening when he woke fully recovered, the physician stated.

This soldier reported that he had had similar attacks of severe reaction to other insect bites.

Science News Letter, September 24, 1949

PSYCHOLOGY

Polio Does Not Change Behavior Pattern of Child

➤ **INFANTILE** paralysis does not leave any pronounced after effects on the nervous habits or the behavior of child patients. This reassurance was given the American Psychological Association meeting in Denver, Colo., by Dr. Dale B. Harris, of the University of Minnesota, as a result of a study of 42 school children made about two years after they had had the disease. These children were compared with a similar number of others who had not had the disease.

Science News Letter, September 24, 1949

MEDICINE

Anemia from Moth Ball Poisoning Reported

➤ **FIRST** report of moth ball poisoning causing anemia in U. S. children was made by Drs. Wolf W. Zuelzer and Leonard Apt of the Children's Hospital of Michigan and Wayne University College of Medicine in Detroit.

The physicians point out that there is

no previous report in this country of anemia caused by poisoning with moth balls (naphthalene) in children although foreign physicians have noted this occurrence. Their report appears in the *JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION* (Sept. 17).

Each of the patients was about two years old and had been seen sucking on moth balls. When admitted to the hospital the children were extremely ill and feverish. In each instance complete recovery followed blood transfusion and doses of sodium bicarbonate and sodium lactate for alkalization of the urine.

Science News Letter, September 24, 1949

ASTRONOMY

Fireball Over Alabama Duplicates Earlier One

➤ **TWO** large fireballs that flashed over Alabama within a week are being chased by astronomers.

The second one was seen from Nauvoo, Ala., early Thursday evening (Sept. 7) and it was in virtually the same position and from the same direction as an even larger one that was seen on Sept. 1.

The American Meteor Society, with headquarters at the University of Pennsylvania's Flower Observatory, Upper Merion, Pa., is asking reports from anyone in northern Alabama, Tennessee, Kentucky or adjacent states who saw either of these meteors from outer space blaze into the earth's atmosphere.

Both these meteors were reported by Thomas A. Scott, University of Pennsylvania student, who has been computing fireball paths as assistant to Dr. Charles P. Olivier, secretary of the Society. The Sept. 7 meteor was observed by Scott's father, H. T. Scott.

Whether the two meteors were physically related, even though they were separated by considerable time, might be determined if enough of the thousands who must have seen them will report where the fireball seemed to start and where it appeared to fall.

The fireball of Sept. 7 appeared a quarter to a third of the size of the full moon, blue-green in color, with a long yellow tail, but without an enduring smoke train.

Fireballs are believed to be debris of the solar system, bits of lost or disintegrated comets, that come into the earth's atmosphere so fast that they are heated to incandescence. Most of these meteors are consumed before they hit the ground or very small fragments are left.

Mr. Scott also observed the great fireball of June 7, 1948, which was remarkable for its long-enduring train. The path was charted through the use of over 70 observations of this meteor received as a result of newspapers publishing the Science Service report asking for observations.

Science News Letter, September 24, 1949



MEDICINE

Antibiotic Cures Skin Ills Without Sensitizing Victim

➤ **AN** antibiotic ointment which will cure skin diseases and not make the patient allergic to the chemical, was reported in the *JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION* (Sept. 17).

Dr. Jack L. Derzavis, Major J. Sidney Rice, and Lieut. Col. Louis S. Leland, Medical Corps, U. S. Army, patch-tested 150 patients at Walter Reed General Hospital and Gallinger Municipal Hospital in Washington, D. C., in an attempt to discover an effective antibiotic for skin diseases which would not leave the patient sensitive to the drug as penicillin and the sulfa drugs are known to do.

Bacitracin, the antibiotic discovered in the infected leg of a little girl and named for her, answered their needs. When applied in ointment form to the skin of 138 patients with various types of skin conditions, a cure resulted if the diseased area was accessible to an application of the ointment. Moreover, only one patient showed sensitivity to it and he was allergic to many other medications.

Science News Letter, September 24, 1949

PSYCHOLOGY

Special "Thought Wave" Involved in Remembering

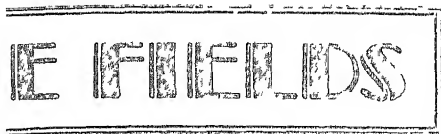
➤ **WHEN** you are trying to remember, your brain has a special electrical rhythm.

Kappa brain waves—those electric signals from the brain itself that are associated with thinking—are most active at that time, the American Psychological Association meeting in Denver, Colo., learned from Drs. John L. Kennedy and Robert M. Gottsdanker, of Tufts College. These psychologists are among the four who first discovered this "thought wave" last year.

The kappa brain waves were recorded for 90 normal adults while they were working at various mental tasks, including making discriminations, figuring out arithmetical computations, solving "insight" problems, reciting very well learned material, and recalling imperfectly learned material.

When you are beginning to learn a new mental task, there is very little kappa activity, it was found. The kappa waves are at their height during the recall of imperfectly learned material. They are at their low point when you are reciting very familiar material.

Science News Letter, September 24, 1949



MEDICINE

Wood Alcohol in Dead Body May Be Sign of Diabetes

► FINDING small amounts of wood alcohol in the tissues of a dead body may be a sign that the person died of previously unsuspected diabetes, not of wood, or methyl, alcohol poisoning.

The importance in crime detection of ruling out diabetes in such cases is emphasized in a report by Dr. Henry Siegel and Harry Schwartz of New York City's Chief Medical Examiner's Office to the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Sept. 17).

They discovered this in examining the body of a 15-year-old girl who died nine hours after being admitted to the hospital in a stupor. Routine analysis of the stomach contents and brain for all poisons was made. In the brain there were small amounts of a substance which gave the chemical reactions of wood alcohol. Faint traces of this substance were also found in the stomach contents.

Three color tests for wood alcohol were made on a steam distillate from the dead girl's brain. They were all positive.

Special investigation by one of the scientists as well as by the police "revealed no possible source where the girl might have obtained methyl (wood) alcohol," the scientists report.

There was no diabetes in the family, but the history of the girl's short illness and other findings in the examination of her body gave the diagnosis of diabetes.

How the methyl alcohol got into the body tissues is not known. It might have resulted from chemical breakdown of other substances and may have been part of the faulty food use in diabetes complicated by acidosis and coma. It may, though the scientists do not yet know, also be found in patients dying from other diseases complicated by acidosis.

Science News Letter, September 24, 1949

MEDICINE

New Test Tells Whether Mama Cow Will Have Baby

► A NEW test for early pregnancy in cows is announced by Dr. J. L. Bhaduri and his student, Mr. N. R. Bardhan of the University of Calcutta, Calcutta, India.

The test detects pregnancy as early as 55 days after conception, or some five weeks earlier than is now possible by other means. It may detect pregnancy in cows even earlier, but the University of Calcutta sci-

entists have not yet been able to make tests on cows earlier in pregnancy.

The test is an adaptation of the human pregnancy test in which male frogs and toads are used. In testing humans, untreated urine from the woman is injected into the frog or toad. Rapid release of spermatazoa by the animal shows that the woman is pregnant. Urine from pregnant cows failed to produce this response in the male toads, but the Calcutta scientists found that solutions of cow dung, or manure, did.

The new test calls for further study, the Calcutta scientists state in their report to the Indian journal, SCIENCE AND CULTURE (Aug.), since the number of cases so far studied by them is too small to warrant definite conclusions. But they think it promises a great deal for the future, especially where artificial insemination is practiced as a routine.

Science News Letter, September 24, 1949

PSYCHOLOGY

Find People Have Natural Speed for Muscular Work

► THE popular idea that each person has his own characteristic tempo at which he works is partially confirmed by experiments reported to the American Psychological Association in Denver, Colo., by Dr. Horacio J. A. Rimoldi, Argentine psychologist, now on the faculty of the University of Chicago.

Statistical study of results of 59 tests administered individually to 91 university students showed that there is probably a natural speed for individuals which is common for most motor activities. It does not hold for other kinds of work such as speed of perception or of knowing, Dr. Rimoldi indicated.

Science News Letter, September 24, 1949

VETERINARY MEDICINE

Farmers Warned of Lead Poisoning Danger to Cows

► PAINTED surfaces are a dangerous temptation to cows as well as children.

The youngsters often chew the painted surfaces, and cows lick them.

In either case, lead poisoning may result if the paint contains lead. As a safety measure, for the cows, the American Veterinary Medical Association in Chicago warns farmers to use non-lead containing paints on interiors of cow barns and stables. The warning also says to keep cows away from fences and buildings freshly painted in the fall clean-up and not to leave old paint cans and paint-saturated rags around barnyards.

"For some reason, cows like the taste of fresh paint," the Association states.

Science News Letter, September 24, 1949

MEDICINE

Prove Mosquitoes Carry Eastern Horse Disease

► FIRST proof that mosquitoes carry the virus of a severe and often deadly disease of horses and man has been found by four researchers of the U. S. Public Health Service's communicable disease center in Atlanta, Ga.

The disease is known technically as eastern equine encephalomyelitis. The layman knows it as a "sleeping sickness," which attacks both man and horses. Very young children are often victims.

Its cause is one of two viruses, a western strain and an eastern strain.

Proof of the long-suspected role of the mosquito in carrying this virus came when the Public Health Service researchers found the virus in mosquitoes collected from farms in Burke and Jenkins Counties, Ga., where sick horses had previously been reported. Scientists have known for some time that the mosquito could be made to carry the virus in laboratory experiments, but this is the first time the eastern strain virus has been found in mosquitoes in nature.

Scientists who found the proof are Miss Beatrice F. Howitt, Dr. H. R. Dodge, Dr. L. K. Bishop, and Miss Rachael H. Gollic.

Science News Letter, September 24, 1949

PSYCHOLOGY

Test Word Knowledge With Series of Pictures

► A 15-MINUTE test of picture recognition tests a child's or adult's knowledge of words without requiring him to speak or write. The person tested has only to look at one of a series of plates, each containing four drawings and indicate which picture best illustrates a given word. This test has proved especially useful in testing children with speech difficulties, spastic paralysis or other handicaps which make it difficult for them to speak or write, the originators, Dr. Robert B. Ammons and Miss Helen S. Ammons, of Tulane University, reported to the American Psychological Association in Denver, Colo.

Some 226 words are illustrated by the four drawings appearing on each of 16 plates. A child would point out the drawing of a head-on collision when given the word "accident." An adult might select the same drawing to illustrate the word "negligence." A child would indicate the picture of a child in tears as a response to the word "crying," an adult might respond with the same picture to the word "lachrymation."

The test has already been tried out on 480 white children, 120 white adults, 80 Spanish-American children, and 80 Negro children.

Science News Letter, September 24, 1949

ASTRONOMY

Total Moon Eclipse Coming

Second lunar eclipse this year, it will be visible both in North and South America. Another event of the month will be the partial eclipse of the sun.

By JAMES STOKLEY

➤ MOST interesting event of the astronomical calendar for October comes on the evening of Thursday, Oct 6. Then, for the second time this year, the moon is totally eclipsed as it enters the earth's shadow. And again the eclipse will be visible generally over North and South America. For an hour and 14 minutes (from 9 19 to 10 33 p. m., EST) our planet will obstruct the usual supply of light on the moon, putting it in total eclipse. Then it will take another hour and 15 minutes for the moon to emerge from the shadow.

This is not the only eclipse that October brings, but the other, on Oct 21, is not of any great importance, even though it is the sun this time that will be hidden partially as the moon passes in front. First of all, it is visible only from New Zealand, parts of Australia and New Guinea and Antarctica. From the point where the eclipse is greatest, near the coast of the Antarctic continent, only 96% of the solar diameter is covered. Thus, there will be none of the features that induce astronomers to travel great distances to see a total eclipse when the sun is completely hidden.

Aside from the lunar eclipse, the evening skies of October bring us the characteristic constellations of autumn. The only planet easily seen in the evening is Jupiter, whose position in the figure of Capricornus, the sea-goat, is shown on the accompanying maps. These depict the skies as they appear at about 10 00 p. m., your own kind of standard time, Oct 1, an hour earlier at the middle of the month, and about 8 00 p. m. at the end. Since Jupiter is very bright (of astronomical magnitude minus 1.9) it is easily found as it shines in the southwest.

Now an evening star, and considerably brighter than Jupiter, is the planet Venus, which is in the constellation of Scorpius, the scorpion. Since it sets about two hours after the sun, it is not shown on the maps. The other planets of October are seen in the morning sky before sunrise. Mars, in Leo, the lion, comes up in the east about an hour after midnight. Saturn, in the same constellation, rises a little later. Mercury will be seen low in the east just before sunrise about Oct 19, when it is farthest west of the sun.

Among the evening stars Vega, in Lyra, the lyre, is brightest, and shines in the western sky, as shown on the maps. Above it is Deneb, in the figure of Cygnus, the swan, and nearby to the left is Altair, in Aquila, the eagle. These are all of the first

magnitude, as also is Capella, in Auriga, the charioteer, shown low in the northeast. Nearby, to the right, is Taurus, the bull, with brilliant Aldebaran. Still another first magnitude star is seen low in the south, Fomalhaut, in Pisces Austrinus, the southern fish.

A characteristic figure seen high in the south is the "great square of Pegasus," the winged horse. These four stars are easily identified, the one in the upper left being part of Andromeda, the chained princess. Below and to the left are the fishes, Pisces, while still lower and to the right, under the row of stars beginning with Markab that forms the horse's head, is Aquarius, the water carrier. Below Pisces is Cetus, the whale, making this part of the sky, all in all, rather a watery region!

Although a total moon eclipse is not as spectacular as the corresponding condition of the sun, it does have many points of interest, and has the great advantage of wide visibility. A total eclipse of the sun actually occurs more frequently than one of the moon but is visible only along a path perhaps 150 miles wide and several thousand miles in length, where the core of the moon's shadow hits the earth. The last time such a "path of totality" crossed any part of the United States was in July, 1945, and the next will not come until October, 1959. In contrast, an eclipse of the moon, when it does occur, is visible over more than half the earth. Thus, from the United States, we have two in 1949, and another next year, on Sept 26.

Like any solid object, the earth casts a shadow into space, on the side away from the sun. This shadow is in two parts. There is a deep, inner core, called the umbra, from which the sun is completely hidden by our globe. But outside this is a larger area, the penumbra ("almost-shadow")

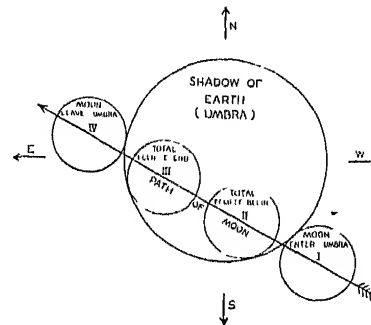
where the earth partially hides the sun.

Whenever the moon is full, it is opposite the sun in direction from the earth. Since the plane in which the moon encircles the earth does not coincide with that in which the earth goes about the sun, however, usually the full moon misses our shadow, passing either to its north or south. Twice each lunar month, in which the moon goes through its cycle of phases, it crosses the plane of the earth's orbit, at points called nodes. And when full moon happens to come at or near a node, the moon goes into the earth's shadow and an eclipse occurs. This month the moon is both at a node and at full phase on the evening of Oct 6, and so we have an eclipse.

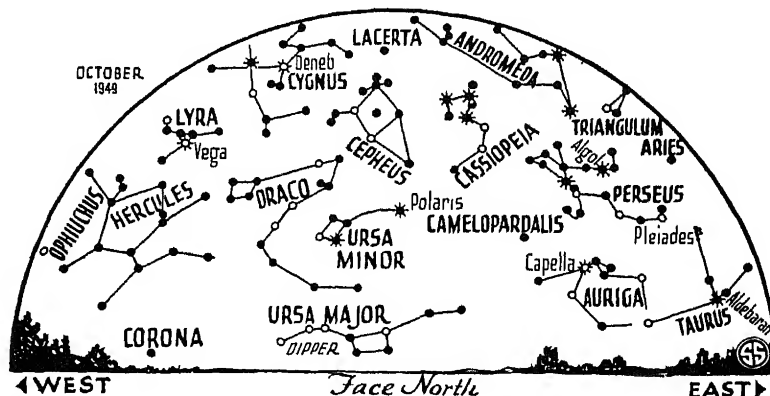
The following table gives the times of the principal features of this event.

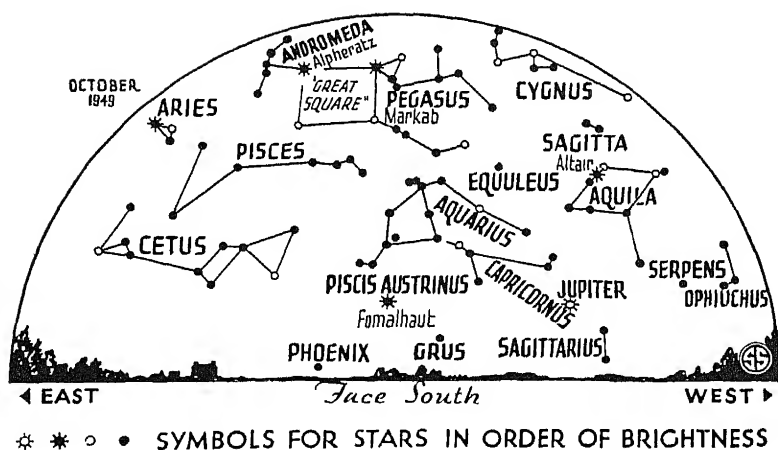
	EST
Moon enters penumbra	Oct 6 6 50 p. m.
Moon enters umbra	8 05 p. m.
Moon completely eclipsed	9 19 p. m.
Middle of eclipse	9 56 p. m.
Total eclipse ends	10 33 p. m.
Moon leaves umbra	11 48 p. m.
Moon leaves penumbra	Oct 7 1 03 a. m.

Nothing will be visible at 6:50 p. m. because then only a minute proportion of the sunlight will be cut off from the moon. But an hour later the northeastern edge of the moon will begin to pale. At 8:05 this edge will make contact with the earth's shadow, as shown in I in the diagram. It



should be noted, by the way, that in this diagram north is the direction toward the





pole star Throughout the United States and Canada, the eclipse will occur in the evening, earlier the farther west you are. To get the moon oriented, as it will appear in the sky, hold the diagram with the arrow labeled "north" pointing upwards and to the left. Thus, it will be the left hand edge of the moon, as you see it in the sky, where the shadow will first appear.

During the hour and 14 minutes that the moon takes in entering the umbra, the curved edge of the terrestrial shadow will be seen on its face. This, incidentally, is an unassailable argument for the earth's roundness, for it is always curved the same way, and only a sphere invariably casts a round shadow.

While the moon is in total eclipse, it will not be likely to vanish completely, unless conditions are most unusual. Instead it will shine with a ruddy light, bent into the shadow by the prismatic action of the earth's atmosphere. While the sunlight thus passes through the air, its blue rays are scattered to give the characteristic daytime blue sky and the light that remains is predominantly red.

During the eclipse there is a rapid cooling of the lunar surface. Before it starts, astronomical instruments would show it to be around 275 degrees Fahrenheit, but during the eclipse this drops to about 175 degrees below zero Fahrenheit, some 65 degrees colder than dry ice. This quick cooling is due to the fact that, unlike the

earth, the moon has no atmosphere to ameliorate conditions, and also that it is covered with some sort of material, perhaps like pumice, which cannot hold much heat.

At the end of the total eclipse, shown at III on the diagram, the curved edge of the umbra again appears on the moon's face, and from III to IV it creeps across the disk, which gradually becomes fully illuminated. With its passage out of the penumbra, full sunlight once more is shining on the moon, and again it looks like an ordinary full moon to which nothing has happened.

Time Table for October

Oct	EST	
3	3 00 p m	Mercury between sun and earth
6	9 52 p m	Full moon and total eclipse of moon
7	noon	Moon farthest, distance 252,500 miles
14	11 06 p m	Moon in last quarter
17	7 44 a m	Moon passes Mars
18	7 02 p m	Moon passes Saturn
19	4 00 a m	Mercury farthest east of sun
20	10 48 a m	Moon passes Mercury
21	10 00 a m	Moon nearest, distance 222,000 miles
	4 23 p m	New moon
24	10 58 p m	Moon passes Venus
27	3 32 p m	Moon passes Jupiter
28	12 04 p m	Moon in first quarter

Subtract one hour for CST, two hours for MST, and three for PST.

Science News Letter, September 24, 1949

ENGINEERING

Canada's Power-Use High

➤ CANADA, with less than one-tenth the population of the United States, has developed so far 11,000,000 of her 52,000,000 horsepower hydro-electric potential, as compared to the development of 23,000,000 horsepower of a potential 80,000,000 in her neighbor to the south, the American Institute of Chemical Engineers was told in Montreal, Canada, by Dr. Huet Massue of that city, engineer of the Shawinigan Water and Power Company.

Canada's present capacity places the nation second only to the United States in hydro-electric production, he said, adding that the investment required per horsepower in Canada is only about one-half the amount required in the United States.

Within the province of Quebec alone, the hydro installation is about one and two-thirds horsepower per person, he continued. This is almost double that in any entire country. And the average selling-price per

kilowatt hour, he added, is lower than in any other region of North America, or probably in the world. In addition to the 6,000,000 horsepower of hydro-electric energy so far developed in the province, 11,000,000 horsepower remains to be harnessed.

Western Canada is within sight of being able to produce enough oil to meet one-third of Canada's petroleum needs, the engineers were told by M. L. Haider of Imperial Limited. Alberta's crude oil reserves are estimated to be in the neighborhood of 1,000,000,000 barrels, and the fields will be able to produce some 100,000 barrels a day by the end of this year.

Alberta has also great quantities of oil-bearing bituminous sands. In one of the richest areas studied by the Canadian National Research Council, according to W. S. Peterson and Dr. P. E. Gishler of that organization, a bitumen content of 200,000,000 barrels per square mile has been estimated. Processes under study to produce oil from the Alberta sands were described by them. Direct distillation is under a pilot plant test.

Science News Letter, September 24, 1949

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PUBLIC HEALTH

Reasons for Polio Rise

➤ WE ARE having more infantile paralysis because we have more children under 15 years of age. The serious housing shortage and the fact that good transportation now brings country and city people together are two more likely reasons for the increase in the disease during the past 10 years, statisticians of the Metropolitan Life Insurance Company in New York declare.

The number of reported cases of infantile paralysis has been higher in the past 10 years than in any previous comparable period, they report.

In about the same period of time, since 1940, the population under age 15 has increased from 33,000,000 to nearly 40,000,000, or more than 20%.

The housing shortage would play a part because of the crowded living conditions which might favor the spread of the disease. Since people can and do travel more, those living in rural areas are not so isolated as formerly and that may explain the increasing frequency of infantile paralysis in areas that formerly had little of the disease.

Improved diagnosis and reporting of cases probably accounts for some of the increase, the statisticians point out. They term this increase an "apparent" one while the

other conditions would lead to a real increase in cases.

Deaths from infantile paralysis have been going down, even though number of reported cases has increased. Last year, when the number of cases was greater than any year since 1916, the death rate among children insured in the company's industrial department was only one-fifteenth of the all time high of 1916 and less than one-half the 1931 rate.

The long-term decline in the death rate resulted chiefly from the decline in mortality at ages under 10, especially among girls. At ages over 10, especially among boys, there is some sign of a rise in the mortality. The reason for this is not clear.

Science News Letter, September 24, 1949

VETERINARY MEDICINE

Bigger Pigs on Less Feed Promise of Gland Treatment

➤ A GLAND treatment that makes pigs into bigger porkers on less feed has been discovered by Dr. R. Braude of Reading, England.

On this treatment the pigs in Dr. Braude's experiments used one-third of a pound less feed for every pound of live weight gain, amounting to a 10% saving in feed. The new fattening process increased the size and weight of the animals but the gain was apparently in lean meat, since carcasses of treated animals were not as fat as those of untreated litter mates.

A synthetic female sex hormone, called stilbestrol, and iodinated casein were used in the first experiments. Dr. Braude is now substituting synthetic thyroxine, iodine-containing thyroid gland chemical, for the iodinated casein. He expects to try the new fattening process on a commercial scale soon.

Pork from these treated pigs will be fit for human consumption, Dr. Braude reported on the basis of experiments by Dr. Peter Bishop of Guy's Hospital, London. Dr. Bishop fed pork from the experimental pigs to volunteer women patients without adverse effects.

Science News Letter, September 24, 1949

NUCLEAR PHYSICS-PSYCHOLOGY

Men More Hopeful than Women about Atom Energy

➤ MEN are more hopeful than women about the development of atomic energy, Dr. Lillian Wald Kay, of New York University, found from interviews of 6,500 adults in New York City and Cincinnati, Ohio, who attended an exhibit of Man and the Atom.

Women are less well informed about

applications of atomic energy than men but are more ready to ask for information about all uses, including weapons.

Among those who are informed about possible peacetime uses of atomic energy, men and women differ in their principal interests. Men are concerned about the applications to power. Women are interested in medical uses.

Dr. Kay reported her findings at the meeting of the American Psychological Association in Denver, Colo.

Science News Letter, September 24, 1949

GEOLOGY

Age of Atlantic Ocean Is Half Billion Years

➤ THE depths of the Atlantic Ocean have been very much as they are today for 500,000,000 years, about a quarter of the known age of the earth.

The supposed youth of the Atlantic basin, generally placed at only 70,000,000 years, was exploded by underwater depth charge explosions set off by the Albatross ocean bottom exploring expedition.

Prof. Hans Pettersson, Swedish oceanographer who led the expedition, reported the new age determination to the British Association for the Advancement of Science meeting at Newcastle-Upon-Tyne, England.

Soundings of the sea were made by echoes from the explosions. Two echoes were obtained, one from the top of the layer of sediment and the other from underlying bedrock. The sediment depth was shown by this method to be 12,000 feet. The rate at which sediments on the floor of the ocean accumulate now is about a quarter of an inch (seven millimeters) per 1,000 years. Simple calculation gives the age as about 500,000,000 years.

Science News Letter, September 24, 1949

Words in Science— SPEED-ACCELERATION

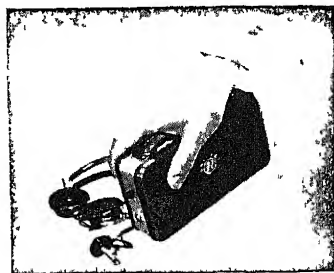
➤ SPEED is the rate of travel of an object. It is expressed in miles per hour or feet per second.

Velocity is not just a hard way of saying speed, it means speed in a given direction. Velocity in one direction is not at all the same as velocity in another direction even though the speed may be the same.

Acceleration is the rate of increase in velocity. A car that has a quick pick-up accelerates well. Acceleration is usually expressed in feet per second per second. The repetition of "per second" is not a misprint because acceleration means change in velocity. It is the increase in speed (feet per second) that occurs in each second.

Science News Letter, September 24, 1949

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GENERAL SCIENCE

Servicemen Have Changed

➤ THE gray lady and the other Red Cross workers are the same as they were before the War, and the services they offer are the same, but the serviceman is different.

He is younger. About half a million of those who entered the service in 1948 are under 21 years old.

There are more of them. The armed forces in 1939 numbered just over a quarter of a million. Now one and two-thirds million men are under arms.

He may be located anywhere in the world. Our peacetime army before the war was located in posts within our own borders, within easy mail or travel distance from home and in constant communication with friends and families. Now the soldier may be in Europe or in Asia, thousands of miles from home where communication is difficult and slow.

Faces change. The armed forces now have a rapid turnover in personnel. About three-quarters of a million entered the services in 1948 while nearly half a million left.

The new soldier is a civilian. The peacetime army man before the war was a regular, he was a professional soldier who looked forward to a career of military service. In the main, the young man in the armed forces today is looking forward to only a temporary stay in service. He expects to go back to his community and establish himself there in business, industry or a profession.

This makes it more important than ever before to maintain the line between the soldier and his home community—a function of the Red Cross worker.

Before or during the war, the soldier took to the Red Cross worker his problems of a wife who needed money for an emergency in the home, a sick child who needed special care, an aged mother, destitute and critically ill.

Notwithstanding all that the military establishment does for the training and welfare of its personnel, today's young soldier

needs contact with someone who can help solve his personal problems. His mother at home wants to be reassured when he fails to write to her.

Many think of Red Cross services in terms of canteens that serve coffee and sandwiches and a chocolate bar to men at the point of embarkation. But this pleasant contact is only a small part of what the Red Cross does for the service man or woman. The service to the Armed Forces is the largest single activity of the American Red Cross national organization. It includes Consultation and guidance on personal or family problems, financial assistance in the form of loans or grants to enable a man to get home in case of death or other emergency in the family, communication between servicemen and their families and answering inquiries about the location and welfare of men who haven't been heard from at home (the Red Cross has its own telecommunication system which ties together every individual in the entire organization), information about legislation and how to obtain benefits, recreation, water safety training.

Science News Letter, September 24, 1949

ANTHROPOLOGY

Pueblos Forced Out by War and Not Nature

➤ THE mysterious abandonment of the Pueblo Indian villages, in the thirteenth century in the southwestern United States, was due to war, not drought or depletion of the forests, as previously thought.

Dr. Deric O'Bryan of the Santa Fe Laboratory of Anthropology, Santa Fe, N. Mex., has concluded that marauding tribes of other Indians, who were nomads, forced the settled Pueblos to leave, finally, the fortified villages which are now archaeological and tourist wonders.

Science News Letter, September 24, 1949

METEOROLOGY

Air Chemically Same 42 Miles Above Earth

➤ THE chemical composition of air 42 miles high is exactly the same as that near the earth scientists at the University of Durham, London, England, have found.

Using samples of air collected by V-2 rockets during two successful flights, Dr. K. F. Chackett, Prof. F. A. Paneth and E. J. Wilson analyzed the gas from 42 miles, or 70 kilometers, for argon, helium, and neon.

They found no detectable difference between air at ground-level and that in the stratosphere, they report to the journal, NATURE (July 23). For various prob-

lems in meteorology and physics, it is important to know the composition of the earth's atmosphere at all heights. Direct chemical analysis is the best method of obtaining this information.

Science News Letter, September 24, 1949

ENGINEERING

Water Fog Effective As Fire Extinguisher

➤ HIGH-PRESSURE water fog fire-extinguishing systems are effective in killing "spill fires" of gasoline on a concrete test slab, it has been determined at the Army Engineer and Development Laboratories at Fort Belvoir, Va., where recent tests have just been completed. High-pressure equipment was found to be four times as effective as low-pressure units.

Water fog, a relative new-comer to the fire-fighting field, is an improvement over the traditional water spray method, Army engineers state. Fog differs from spray in the more minute size of the droplets.

In these tests the superiority of high-pressure over low-pressure fog was established, with somewhat less notable but equally significant results, at low rates of discharge. Average extinguishment time at 15 gallons per minute was 26 seconds for 1,500 pounds pressure, and 52 seconds for 100 pounds pressure.

Using high-pressure nozzles especially constructed to deliver 35 gallons of fog per minute at 1,500 pounds per square inch pressure, fire fighters succeeded in extinguishing a series of 10 test fires in an average of nine seconds. Pressures this high, however, make handling the nozzle difficult. Subsequent tests using 500 to 1,000 pounds nozzle pressure gave average extinguishing time of 13 and 10 seconds, respectively.

Principal advantage of water fog in combating fire is that of water economy, the engineers assert. This is an important consideration in military fire-fighting equipment for use where water is scarce. Used against liquid fires, fog has the added advantage of not scattering the burning fuel.

Science News Letter, September 24, 1949

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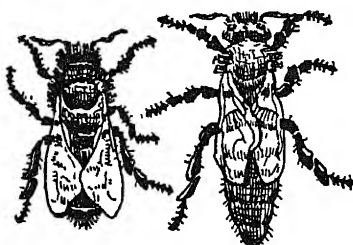
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Trail of the Bee

➤ **HONEY** is a mouth-watering word all over the world. Save for Eskimos and Tunguses and a few other remote tribes in forsaken regions so luckless as to be without bees, all human beings know it—and think of only one word in connection with it: “Mo.e, please!” And plenty of our sub-human animal kindred, from bears to flies, are no less fond of it than we ourselves.

Honey is commonly classified according

to the flowers from which the bees have taken the nectar, its raw material. White clover honey has become staple and standard over practically the whole of the United States, and for most of Europe as well. Along with it, and closely resembling it, are the honeys derived from sweet clover and alfalfa.

But honey gourmets from various sections set up local favorite varieties as superior to the clover product. Usually such preferences are based on a fragrance or flavor of regionally dominant nectar plants, from which the honey derives a distinctive aroma or bouquet, no less characteristic than the bouquets of wines that enable connoisseurs to exalt the Moselle valley, or the hills of Burgundy, or the islands of the Aegean, according to their several preferences.

No one who has ever tasted the orange-blossom honey of Florida is likely to forget it. Yet from the opposite corner of the country may come a claim that it is not to be compared with the apple-blossom honey of the Pacific Northwest. Californi-

ans have their orange-blossom sweet, too, but must divide their allegiance between this and the rich honey from the white sage and ceanothus of their foothills.

In the Ohio Valley and the Southeast as well as over a considerable part of the Middle Atlantic region, three forest trees yield a considerable part of the honey crop: linden or basswood, tulip poplar, and black locust. These honeys all have their devoted followers among the sweet-toothed population.

But those who have, with dripping tongues, followed the Trail of the Bee, over the whole American map, sipping from her many combs as she sips from many flowers, would probably cast a majority vote in favor of a honey known in the Southern Appalachians and apparently not elsewhere: sourwood honey. He who has known the nectar of that unpromisingly named tree knows he has tasted perfection. For his tongue there are no more worlds to conquer.

(Reprint from SNL, Oct 15, 1938.)

Science News Letter, September 24, 1949

MEDICINE

Cancer in Mentally Ill

➤ **MENTAL** patients are less likely to have cancer than are other persons.

Figures on the cause of death in Chicago State Hospital show that in 1935-37 cancer was the cause of only 2.5% of all deaths; in this institution ten years later, 1945-47 the rate had gone up, but only to 4.5%. For the general population, cancer deaths account for from 10% to 12% of the total.

In spite of the fact that the rate of admissions to the hospital had increased in 1945-47 over the rate for the 10 years before, the number of deaths had not increased and the death rate was actually lower. Dr. Herman Josephy, of Chicago, said in reporting the figures to the *AMERICAN JOURNAL OF PSYCHIATRY* (Sept.).

There were more deaths of old age patients in the more recent period, but this was because of the increased influx of senile patients.

Many of these old people die just about as soon as they reach the hospital, Dr. Josephy found. About 20% of those in their 70's are dead within one month of admission. About 25% of the octogenarians have the same fate.

In fact, out of every 100 seniles admitted in January and February of a year, only 60 are still alive when June rolls around. “It seems justified to ask,” comments Dr. Josephy, “whether these patients (who, of course, are senile psychotics) could not have died at home as well as in the hospital. It is very likely that they did not benefit from the transport from home to the Psychopathic Hospital and from there to the State Hospital.”

On the other hand, there are quite a

number of senile patients who survive for several years in the hospital. A few patients admitted as octogenarians survived for more than six years and died in the second half of their nineties.

Deaths from exhaustion in the course of acute schizophrenia have markedly decreased, Dr. Josephy reported. The same is true, he said, for deaths from general paresis. Delirium tremens has disappeared as a cause of death, at least from Chicago State Hospital.

Science News Letter, September 24, 1949

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POLIO

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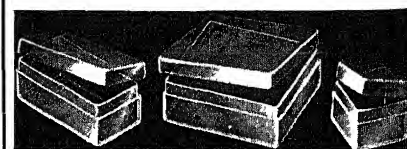
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ADULT EDUCATION ACTIVITIES OF THE PUBLIC SCHOOLS Report of a Survey, 1947-48—Federal Security Agency Office of Education—Gov't Printing Office, 21 p., illus., paper, 15 cents. This survey answers major aspects of the question: What is now going on in adult education under public school auspices?

ALLOY STEELS, CAST IRON AND NON-FERROUS METALS—F. Johnson—*Chemical Publishing Co.*, 227 p., illus., \$5.00. A technical work for those who are interested in processing steel and various alloys.

APPLIED BIOPHYSICS—N. Howard-Jones—*Chemical Publishing Company*, 293 p., illus., \$6.75. Seventeen authorities write on the origin in biology and physics of diagnostic and therapeutic procedures used in medicine and surgery.

BASIC ELECTRONICS—Royce G. Kloeffler and Maurice W. Horiell—*Wiley*, 435 p., illus., \$5.00. Fundamentals of electronics in condensed form. For the person who already has a knowledge of elementary physics.

HOUSEHOLD EQUIPMENT—Louise J. Peet and Lenore Sater Thye—*Wiley*, 3rd ed., 418 p., illus., \$5.00. The material is completely re-

worked in this reference book for home-makers, students, and home economists.

PRINCIPLES OF ORGANIC CHEMISTRY—James English, Jr. and Harold G. Cassidy—*McGraw-Hill*, 512 p., illus., \$5.00. An elementary text designed for chemistry majors taking a full year's course.

SIRIINGTH OF MATERIALS—Gerner A. Olsen—*Prentice-Hall*, 442 p., illus., \$5.70. A text designed chiefly for courses where calculus is not required.

THE STUDY OF ROCKS—S. J. Shand—*Mosby (Macmillan)*, 2nd rev. ed., 236 p., illus., \$2.50. For the advanced student.

TITANIUM: Its Occurrence, Chemistry, and Technology—Jelks Barksdale—*Ronald*, 591 p., illus., \$10.00. A working reference volume with an ample bibliography.

A YEAR BOOK OF RAILROAD INFORMATION 1949 Edition—*Eastern Railroad Presidents Conference Committee on Public Relations*, 96 p., illus., paper, free of charge upon request to publisher, 143 Liberty Street, New York 6, New York. A large amount of statistical data.

Science News Letter, September 24, 1949

MEDICINE

Detecting Ills by Sound

➤ **HIGH-PITCHED** sound waves may be able to detect flaws in the body just as they detect flaws in metal.

Ultrasonics, sound waves pitched above the range of the human ear, is being explored for its diagnostic and treatment possibilities in studies with animals at the Mayo Foundation. Dr. Paul A. Nelson of the Foundation told the American Congress of Physical Medicine meeting in Cincinnati, Ohio. Its application to disease must wait upon the discovery of the effects of ultrasonic radiation upon the physiology of the body.

Research on dogs has revealed that the sound waves generate heat which is con-

fined to the area at which the sound waves are directed. Dogs' legs exposed for two minutes to this radiation showed a temperature rise in the bone marrow of 64 degrees Fahrenheit, in the bone cortex of 49 degrees, in the muscle of 26 degrees, and 195 degrees in the subcutaneous tissue.

Research is also being made into the effects of ultrasonics on malignant tumors in animals. Dr. Nelson said that so far no conclusions have been made as to its possibilities in this field.

However, he did point out that there is a chance that ultrasonics may be perfected so that tumors in animals and humans may be detected by this method.

Science News Letter, September 24, 1949

HOUSES OF EARTH

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INVENTION

This Is Hot Stuff For Snow Time

➤ **WITH** winter ahead, and not too far away, an easy method of snow removal from city streets, for which a government patent was recently issued, is of interest. It uses a truck with a "melting pot" into which the snow is shoveled, to be immediately turned into water.

The melting pot is a tank or trough-like device, suspended within the truck body. Spanning the open top of the tank, a little below its sides, is a removable box-like

heater or burner assembly. A gaseous or liquid container to the front of the tank supplies fuel to the burners. The water formed drains to the side, then to the bottom of the tank and out, if desired, to the gutter of the street.

The upper surface of the heater floor contains many upward-pointing sharp spikes. These break up lumps of snow or ice shoveled in, making melting easier. Hand shovels are not necessarily required, modern mechanical snow loaders may be used. The recipient of the patent, number 2,481,199, was Alex Cayas, Glendale, Calif.

Science News Letter, September 24, 1949

The Fundamentals of College Chemistry

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⚙️ **SHAMPOOING machine for upholstery** is an improved type said to be lighter in weight, more efficient, faster and better-looking than previous models. While the entire machine weighs 40 pounds, the cleaning head, the part held in the hand by the user, is made of magnesium and weighs only three pounds.

Science News Letter, September 24, 1949

⚙️ **MAGNETIC FLY-BOX** will hold 36 fishing flies, any one of which can be brought to the front of the device by merely turning a dial. It makes use of a permanent rotating magnet assembly. It has a clear plastic top which permits the user to see all the flies in the box without opening the cover.

Science News Letter, September 24, 1949

⚙️ **CHEMICAL WORM DIGGER**, to eliminate the labor of spading for fish bait, is a white powder which is dusted lightly over an area containing fresh earthworm holes, then thoroughly sprinkled with water. The worms come completely out of the holes for easy picking; the chemical does not injure the grass.

Science News Letter, September 24, 1949

⚙️ **HAMMER TOYS**, shown in the picture, are made of tough plastic material



and are designed for youngsters who have reached the pounding age. The peg table has six non-removable pegs that can be driven in separately, then released by a blow on the center post.

Science News Letter, September 24, 1949

⚙️ **SOLDERING device** automatically feeds solder to the tip of the iron. The feeding

attachment will fit any standard electric soldering iron from 75 to 250 watts. Slight pressure on a trigger on the attachment, made by one finger of the holding hand, brings the solder to the iron tip as needed.

Science News Letter, September 24, 1949

⚙️ **CARPENTER'S LEVEL** for a blind workman has been developed by the American Foundation for the Blind. It consists essentially of a highly polished steel ball rolling in a highly polished brass angle section, and is read from a dial at one end of the

ter, September 24, 1949

⚙️ **SPRAY**, for paint or any sprayable liquid, is a self-contained, 17-pound unit with compressor, motor and gun within a single streamlined housing. This improved sprayer, which operates on household current, will apply one quart of paint in four minutes, operating with about 50 pounds air pressure.

Science News Letter, September 24, 1949

⚙️ **PLASTIC WASH bottle** for the laboratory will eject a strong, easily controlled stream of fluid when lightly squeezed. This non-breakable Polyethylene bottle is for use with distilled water or commonly used laboratory acid and alkaline solutions.

Science News Letter, September 24, 1949

Do You Know?

Bromine is becoming a widely-used disinfectant for swimming pools.

Only about 200 of the once-numerous Asiatic lions are thought now to be alive.

A six-inch door key, recently discovered in ruins of an English abbey, is coated with tin and is estimated to be 700 years old.

A five-bladed propeller, recently tested on a U. S. Coast Guard cutter, gave practically no hull vibration at any speed; the ordinary propeller has three blades.

In seeding burned-over rough land by airplane, what is called "pelleted seed" is sometimes used; it is seed mixed with soil to form small marbles which, on disintegration, leave soil-covered seeds.

The element fluorine was first isolated by the French scientist Henri Moissan; in 1886 he succeeded in obtaining it by the electrolysis of a solution of potassium fluoride dissolved in liquid hydrofluoric acid.

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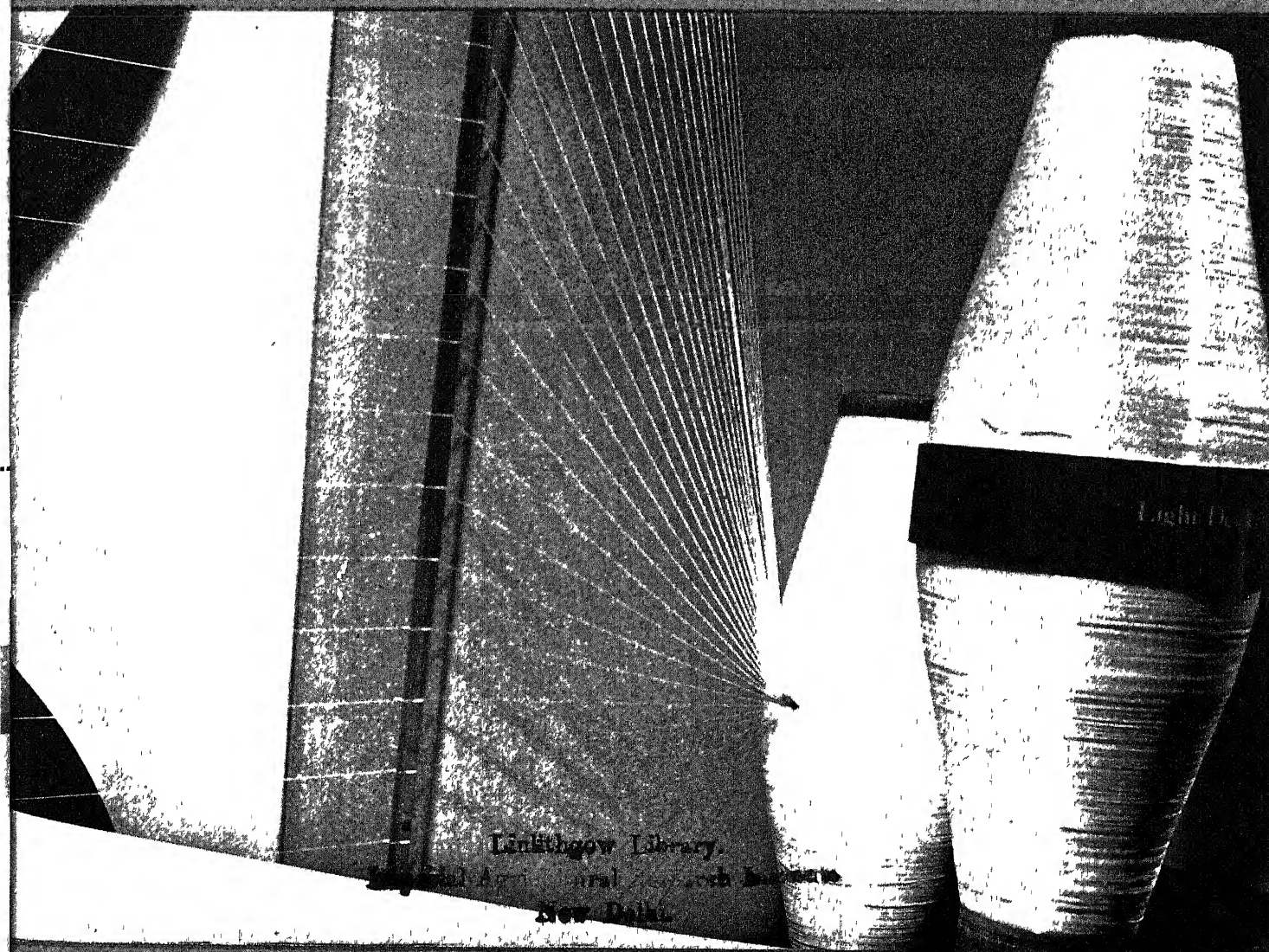
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BIOLOGY

Trials of Germ Warfare

It would be difficult for the Russians to keep secret trials of any biological warfare weapons because large groups of people would be involved.

➤ THE other great secret weapon besides the atom bomb is biological, or germ, warfare BW, the scientists call it for short. The subject is even more hush-hush than atomic energy. Scientific and military opinion, so far as anyone has dared to give one publicly, is divided on whether BW is more or less to be feared than atomic warfare.

The production of BW weapons might be kept secret, so far as cultivating the germs or their poisons is concerned. The laboratories might be given the innocent appearance of a plant producing vaccines for peacetime protection of the population against smallpox, diphtheria, and so on. Apparatus such as cloud chambers for testing methods of spreading the germs might be a little harder to conceal or disguise.

But actual trials of any BW weapon would be a hard secret to keep. And until BW is used in war its practical value, whether it would be effective, cannot be proved.

Any secret trials of BW would have to be made on people—not just a few human volunteers but men, women and children going about their work and play, or on an encampment of troops or of workers on some large industrial project. If effective, news of illness striking like an epidemic, even in a remote, relatively undeveloped area of the world would leak out fairly soon. Of course, there is the possibility that the Soviets could keep secret for a time at least a trial of BW

on prisoners in some closely guarded camp in Siberia.

The bottleneck problem in BW is the large-scale spread of disease germs through the air. Pollution of water supplies, of food in industrial plant cafeterias and of the air in theaters or other public buildings could be accomplished but would be minor. BW offensives, coming under the head of sabotage.

What germs might be used for BW is probably one of the most closely guarded secrets of this or any nation. Botulinus toxin, so deadly a poison that an ounce could kill 200,000,000 humans, and tetanus toxin, a close second as a killer, can probably be discounted. We have these poisons, but they are not practical for BW use because of the difficulty of getting them into enough people.

More effective for BW purposes would be a germ like the parrot fever virus. The value of such germs would come from the fact that the diseases they cause propagate themselves. The parrot fever virus grows and multiplies in the infected person.

Best argument against the use of BW, of course, is the danger of backfire. Once a good epidemic is started any place in the world, it is extremely difficult to stop it. Germs do not recognize international barriers, as has often been pointed out, nor do they know the difference between a friendly and an enemy uniform.

Science News Letter, October 1, 1949

NUTRITION

Well-Fed Standards Set

An imaginary man and woman have been created to reign over the world's food requirements, which have been raised. These are the first universal standards.

➤ MEET "Mr. Well-Fed." A young man of medium stature and middling weight, who will be the world's calorie arbiter, was created by a panel of nutrition experts in Washington.

"Mr. Well-Fed", as he might be called, is imaginary, a composite figment, but with his female counterpart, he will lord it over the world of food in much the same way the standard inch and the standard meter rule the world of measurement.

He will eat better than any previous

"reference man", reflecting the more stable peacetime conditions that exist now than during or right after the war. His food need is set at 3,200 calories per day.

He is 25 years of age, weighs about 144 pounds and works at an active though not constantly strenuous job. He might be a dairy farmer, a truck driver or a laboratory worker who walks around a lot.

"Mrs. Well-Fed" is also 25 years old. She weighs 122 pounds. She might be a housewife taking care of a couple of active

young children. Or she might be a light industrial worker. Her allotment of calories is 2,300 a day.

This hypothetical couple live in a temperate climate, such as might be found in England or Indiana. Their creators are a committee of international nutrition experts who were summoned together by the Food and Agriculture Organization. Their job was to set up accurate food requirements for the different regions of the world.

The committee's work, including the construction of this average couple as a world food yardstick, will be published in the near future. The deliberations were hailed by FAO officials as a major stride forward in properly feeding the world. This is the first time, they pointed out, that standards which are universal the world over have been reached. Prior studies, like the League of Nations and the National Research Council's had only regional application.

Although the committee's reference "couple" are designed for the temperate zone, conversion factors which will fit the standard to any part of the globe have been drafted. These conversions take into account a host of variable factors including climate, individual variation, type of work and play engaged in, and altitude.

Some notion of the advance these figures represent may be found by comparison with earlier estimates. The new calorie figure for a man is 3,200 per day, 2,300 for a woman. The National Research Council has in the past suggested 3,000 as adequate for a grown man. The FAO in 1946 had set a temporary satisfactory maintenance level at 2,200 for men and 1,800 for women. At the same time they had set a rock bottom minimum subsistence level at 1,900 calories.

The new figures of 3,200 and 2,300 calories per day for the reference couple represent a nutritional gain throughout the world.

Science News Letter, October 1, 1949

PHYSIOLOGY

Brain Wave Changes Noted During Pain

➤ PAIN shows up in brain wave records. It registers as a decrease in the amplitude of the electrical waves of brain activity, Drs. F. B. Benjamin and A. C. Ivy of the University of Illinois department of clinical science reported to the American Physiological Society in Augusta, Ga.

Unfortunately, the pain change in brain waves is not specific. Cold, heat and touch cause the same change in brain waves. And the pain change does not depend on the nature and degree of pains. Brain wave records, therefore, cannot be used as was hoped to determine the severity and nature of the pain a patient says he has.

Science News Letter, October 1, 1949

NUCLEAR PHYSICS

Spotting Soviet A-Bomb

Discovery of the Russian atom bomb burst may have come from cosmic ray studies by American scientists. Bomb fission fragments in the atmosphere would be a give-away.

President Truman announced on Sept. 23 "We have evidence that within recent weeks an atomic explosion occurred in the USSR."

"Ever since atomic energy was first released by man, the eventual development of this new force by other nations was to be expected. This probability has always been taken into account by us."

There was no official explanation of how the explosion was detected.

➤ **CLINCHING** proof of Russia's atomic bomb activities could have come from cosmic ray studies by American scientists who have been keeping a careful watch this summer on all radioactivity in the upper atmosphere.

Their studies would show, as no spy could, whether the Soviets were trying to start a false "scare" rumor.

The existence of bomb fission fragments in the atmosphere could not be faked. Such fission fragments would be viciously "hot" strange atoms, radiating furiously, and of a kind never found in nature outside of a bomb or atomic pile. And these fragments could have been detected by cosmic ray scientists.

Here is how it might have been done.

The first indication to a cosmic ray scientist of an atomic explosion in Siberia would be an apparent increase in the number of cosmic ray particles coming in from outer space. In California or Oregon, the increased cosmic ray intensity would be noticed on instruments for a day or two before it subsided. At just about that time the increase would first be noticed in the Midwest, in the balloon flights by the Minnesota observers at Fort Ripley, Minn., or in observations by the Chicago group.

Jump in Cosmic Rays

In Climax, Colo., on the mountain-top observatory where both cosmic ray intensity and sunspot activity are continuously studied, the scientists would simultaneously note the jump in cosmic rays—and without the usual sunspot configuration. Then suspicions might be aroused.

Then, three or four days after hitting the California coast, cosmic ray instruments at Columbia, Princeton and Harvard would kick up all together, and just a little too much for the scientists to believe that it was the usual course of events.

Suspensions aroused, the check-up would begin. The scientists would soon realize that it was not a cosmic ray burst, which would have hit all the stations simultaneously, and with an accompanying solar

flare or sunspot. They would guess that there must be an airborne radioactive contaminant, highly dispersed, that was blowing along with the western prevailing winds clear across the continent.

The routine reports that would at this point arrive from the Peruvian cosmic ray observatory at Huancayo, high in the Andes, would show no cosmic ray increase on or about the dates of the rise in California.

Christchurch, New Zealand, would fail to report any change in their readings. A radio query to the Danish cosmic ray observatory in Godhavn, Greenland, would bring the report of an insignificant wriggle in the record, but which was over a week after the marked increase had been found in California.

Scientists would now be sure there must be a radioactive contaminant in the air, but which was confined to the northern hemisphere of the globe, and which was slowly blowing along in the steady western flow of the atmosphere.

All doubts would disappear when the balloon flight photographic plates showed an enormous increase in the number of low-energy alpha particles—particles thrown out in profusion from the sizzling fission products of uranium, but which are much rarer in cosmic radiation. The first reports of this might have come from the Minnesota group. Immediate confirmation of the Minnesota reports would come from the University of Rochester team, followed quickly by the University of Denver group.

Cosmic rays could not be the cause, that would be definite. Still to be excluded would be the bare possibility of natural radioactive dust blown from some desert perhaps. The Colorado plateau sands are the United States' major source of uranium.

Was it a Russian atomic explosion in Siberia, or was it a natural freak of the winds? Pollen and dust samples, filtered from the air by high-flying airplanes on the dates of the "cosmic ray bursts" would be dug up out of the files. Chemical tests, radiation "sniffers," Geiger counters, spectrographic tests, and mass spectrograms would be run. Strange products, found in such proportions only in bomb products, such as yttrium, neodymium, strontium and krypton might be discovered instead of the usual earth elements of calcium, silicon and iron. There could be no doubt now. The test results could mean only that an unreported atomic explosion had occurred somewhere in the world.

Whether it was a uranium or plutonium bomb would be found from the proportions

of the different elements found in the air.

What could not be known—not unless the Russians tell us—is whether it was a real "bomb" or a fizzled experiment in nuclear energy which blew up a laboratory releasing the radioactive fragments to blow around the world.

Instrument Detection

There are two possible instrumental methods of detecting atomic explosions, additional to the radioactive clouds of debris considered the most likely way.

Earthquake-like waves are started by any large explosion, but natural seismic disturbances are immensely greater than an atomic explosion. The first atomic bomb at Alamogordo in 1945 was detected on seismographs nearby but not on instruments more than 300 miles away. Three world-shaking earthquakes whose origins were near Russia were recorded in July but scientists are sure that they had nothing to do with the Soviet explosion. These were July 4 in the Persian Gulf region, July 10 in eastern Turkistan, July 23 near west coast of Turkey.

A pressure-wave in the air is set up by a gigantic explosion and might be detected by a sensitive barograph. The great meteorite fall in Siberia in 1908 was detected on a microbarograph in England but this immense missile from outer space released more energy than a hundred atom bombs. (See SNL, Oct. 25, 1947, Nov. 22, 1947)

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METAL-ETCHING METHOD—Metal is placed in a partial vacuum containing argon gas, and then the gas is charged with 12,000 volts of electricity creating argon ions which bombard the metal's surface. Thus the physical features of metal can be examined under a microscope and its performance under certain conditions predicted. This is a development of the Ford Motor Co.

CHEMISTRY

Better Synthetic Rubbers

➤ BETTER synthetic rubbers for industry were made known to the American Chemical Society meeting in Atlantic City, N. J.

Withstanding dry heat up to 400 degrees Fahrenheit and at the same time resistant to oil, gasoline and sunlight deterioration, a new polyacrylic and hydrocarbon synthetic called Hycar PA was reported by H. P. Owen of B. F. Goodrich Chemical Co., Cleveland.

The new Goodrich rubber will be used for hose, protective coatings on glass and asbestos, insulation on wire, conveyor belts and particularly where light or pastel colored products requiring color permanence are needed. White goods made from this rubber will not discolor in the sunlight.

New Neoprene Rubber

A new kind of neoprene rubber which will not deform materially under the weight of vibrating machines was announced by D. B. Forman, L. R. Mayo and R. R. Radcliff of Du Pont's Organic Chemicals Department. It will have particular application in mounting motors where the rubber vibration dampener is subjected to heat and oil which neoprene resists.

A new method of increasing the sunlight resistance of neoprene rubbers was reported by D. C. Thompson and N. L. Catton of the same company. The weather resistance of colored neoprene products is increased by use of compounding materials that are clays although other additions to the rubber do decrease weather resistance.

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BIOCHEMISTRY

Beryllium Poisoning Aid

➤ AN ANTIDOTE or treatment for beryllium poisoning may be on the way, thanks to researches by scientists at the University of Chicago Toxicity Laboratory.

Beryllium, used in making fluorescent lights and in many other industrial processes, poisons by interfering with the body's use of sugars and starches, these scientists, Drs. Kenneth P. DuBois, John Doull and Kenneth W. Cochran, announced at the meeting of the American Chemical Society in Atlantic City, N. J.

When beryllium dust is breathed into the lungs, or when the metal gets into the body in other ways, it competes with the calcium and magnesium from food. Both calcium and magnesium are needed for the breakdown of sugars and starches to give energy. Beryllium apparently can combine with the same compounds in the cell that

calcium and magnesium can combine with, but it cannot perform the vital functions of these metals. When it takes their place it therefore blocks the sequence of normal chemical events in the body cells.

The results show up in the serious lung damage which is one form of beryllium poisoning or in bone cancer, rickets and a general failure of metabolism.

The Chicago toxicologists did not report a treatment for beryllium poisoning, but Dr. DuBois said:

"After the mechanism of action of a toxic substance is understood, then attempts to treat the condition can be undertaken in a scientific manner. Fundamental research on the chemistry of beryllium poisoning may lead to the development of an effective means of therapy (treatment)."

The highly valuable properties of beryllium alloys, particularly the copper-beryllium alloys, have greatly increased the metal's industrial importance in recent years.

The chances for exposure to beryllium dusts, Dr. DuBois said, are fairly numerous in industry and may be encountered during virtually all stages of beryllium production.

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CHEMISTRY-NUTRITION

Mass Output of Protein

A method for cheaper production on a mass scale of protein food substances for vein feeding has been announced. It will be made available to commercial producers.

► **LIFE-ESSENTIAL** protein food substances for vein feeding of stomach cancer patients and others too sick to eat can now be made at low cost by a simple method suitable for mass scale production.

The new method, expected to have a revolutionary impact on present production methods, was announced by Dr. Jesse P. Greenstein of the U. S. National Cancer Institute at the meeting of the American Chemical Society in Atlantic City.

As an example of the price saving possible by the new method, Dr. Greenstein said that one of the essential food substances, an amino called L-methionine, can be produced at a cost of 30 cents for a quantity now costing \$6.50. This quantity, representing one-thirtieth of an ounce, is about all any manufacturing company now sells at one time, and the human body needs several times that much every day.

All eight of the essential amino acids can be produced by the new method at similar savings in money. The method is so simple that production by the pound can be achieved by an average technician.

Each of the essential amino acids, as synthesized in the laboratory, includes two closely similar types which are mirror images of each other. They are called L-type, or isomer, and D-isomer. Only the

L-amino acids can be safely injected into the blood stream. But commercial production methods so far have not been able to supply anything like enough even at high cost of the L-amino acids needed by cancer and other patients.

In the method developed by Dr. Greenstein and associates, L- and D-amino acids, obtained cheaply in compound form, are digested in concentrated preparations of animal kidney, liver and pancreas. They are then purified by a series of simple chemical means. The technique will be made available to commercial producers.

Associated with Dr. Greenstein in developing the new method were Drs. Vincent E. Price, Paul J. Fodor, James B. Gilbert, Alton Meister and Carl Baker, all of the National Cancer Institute.

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PSYCHOLOGY

Attitude Affects Success In Use of Artificial Leg

► **DOCTORS** can predict how well a veteran will get along with an artificial leg on the basis of the amputated man's attitude toward himself, Dr. Sidney Fishman, of the Veterans Administration's Prosthetic

Testing and Development Laboratory, New York City, told the meeting of the American Psychological Association in Denver, Colo.

A board of three psychologists interviewed 48 men who had lost one leg, cut off above the knee, and gave them tests which would measure their opinions of themselves. On this basis, a judgment was made of how well they would adjust to the use of an artificial leg.

The judgment was then compared with photographs of the gait of the man with his artificial leg and with questionnaires filled out by the men and by their employers.

More amputated men take a dim view of themselves than are confident, it was found. And this sort of negative attitude causes difficulty in the use of the leg.

Predictions worked out all right, but were more effective when the man's attitudes were consistently either positive or negative.

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ENGINEERING

Giant Windtunnel Designed To Aid Supersonic Flight

► **DETAILS** of a new giant windtunnel for studying supersonic flight at the Langley laboratory, Langley Field, Va., of the National Advisory Committee for Aeronautics, are now released. The "secret" four-foot by four-foot tunnel has been in preliminary operation for the past year.

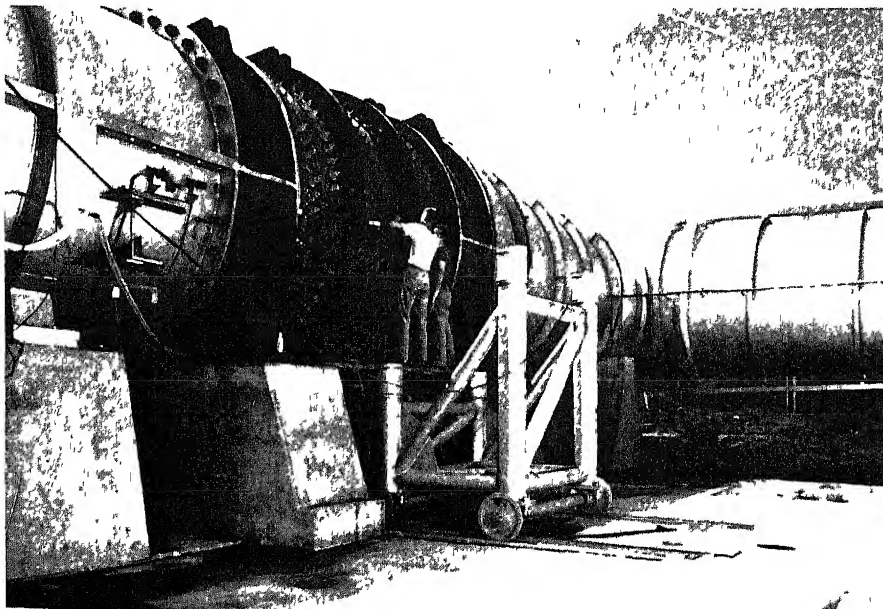
The new facility at the Langley laboratory is designed for the study of certain aspects of flights at speeds faster than the speed of sound, some 760 miles per hour. Because of its size, it permits the use of test models large enough to hold instruments. A 32-inch span model of a complete supersonic airplane now under investigation is fitted with movable controls and more than 300 pressure orifices.

A key element of the new tunnel is a specially designed air compressor of the axial-flow type which generates a flow of 870,000 cubic feet of air a minute. It was designed and constructed by Allis-Chalmers, Milwaukee, in conjunction with NACA Langley engineers.

This compressor is a seven-stage affair, is 11 feet in diameter, and has 1,137 blades. It requires 60,000 horsepower to drive it. It circulates air through the test section of the tunnel at velocities ranging from 1.2 to 2.2 times the speed of sound.

Operating velocities in the tunnel's test section can be varied by adjusting the flexible 25-foot-long walls of the nozzle ahead of the section. By means of gates, the test section can be isolated to permit model changes without returning the entire tunnel to atmospheric pressure.

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NEW SUPERSONIC TUNNEL—Most important single element of the huge tunnel is this 870,000 cfm axial flow compressor.

CHEMISTRY

New Washable Paint

This odorless paint is made up of water and synthetic rubber. The water evaporates leaving a thin sheet of rubber clinging to the wall which sheds dirt easily when washed.

➤ A NEW kind of odorless paint made of water and synthetic rubber looks like milk and spreads on walls like butter. It protects cement and plaster better than ordinary oil paints.

The American Chemical Society meeting in Atlantic City, N. J., heard L. L. Ryden, N. G. Britt and R. D. Visger of Dow Chemical Company, Midland, Mich., predict that this washable rubbery film will be used to coat interior and exterior walls of future houses.

The rubber used in the new paint is an emulsion of butadiene-styrene rubber such as used in auto tires. Countless millions of submicroscopic balls of the rubber are whipped up in the water. When the coat of paint dries by simple evaporation of the water, the rubber balls join in a thin sheet that clings firmly to the wall but lets the dirt slide off it when washed.

Ordinary water-base paints now in use either can't be washed safely or don't get clean when washed.

The new paint can be applied to fresh cement and plaster as soon as they are dry to the touch. Pigments can be added satisfactorily to the new paint, although there are no turpentine, solvents, and oils to cause odors. The rubber paint would be sold in cans ready to apply like other paint and it is more easily manufactured than many other types.

A plastic by-product of the atomic bomb that cannot be dissolved by any known acid, caustic or other solvent was reported to the chemists by a research group from the Oak Ridge atomic energy laboratories. It is known as Fluorothene and it is a war-born fluorine plastic, chemically polychlorotrifluoroethylene. It is being used especially for filters handling highly corrosive and radioactive materials in the atomic energy program.

Pectin from Sugar Beet

What is left over after the sugar is extracted from the sugar beet is now being used to produce pectin, the substance used to jell puddings, jams, cosmetics and drugs. Prof. P. T. Miller of the University of Wyoming reported. One ton of beets processed for sugar can yield 20 pounds of pectin, which is now obtained chiefly from citrus fruits.

Vitamin B-2 in Bread

Commercial production of riboflavin or vitamin B-2, added to bread because most diets lack it in sufficient quantity, is possible by a new fermentation process reported by chemists of the Department of Agriculture's Northern Regional Research Laboratory, Peoria, Ill. A yeast-like organism called *Ashbya gossypii* is the microscopic chemist that does this job.

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tissue, because they are less active and use their muscles less.

"When placed on a very high protein diet a number of our elderly patients showed marked clinical improvement," Dr. Ackerman told the chemists. "They felt better and became more active."

Clue to Cancer Condition

A chemical clue to a cancerous condition of the white blood cells, called myelocytic leukemia, was reported by Drs. Albert A. Dietz and Bernhard Steinberg of the Toledo Hospital Institute of Medical Research. Bone marrow in such cases was found to have an abnormal amount of inorganic sulfate.

Test for Alcohol

An improved method of detecting and measuring the amount of alcohol in the body of those charged with drunken driving was reported by John W. Sease, William H. Harris and Sigmund Jaffe of Wesleyan University, Middletown, Conn. Beverage type of alcohol is converted into gaseous ethyl nitrite which is measured by a color test, while other alcohols do not interfere with the test.

Rutin from Asparagus

Asparagus is a new raw material for producing a compound called rutin that is one of the few hopes of restoring weakened blood capillaries from the effects of radiation from the atomic bomb. A. E. Stevenson of Continental Can Co., Chicago, reported that asparagus too mature for marketing as food has enough rutin content to be a practical source of the chemical, now obtained from buckwheat.

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INVENTION

New Line-Marker Sticks Aid Night Football Games

➤ QUARTERBACKS at night football games will know from a quick sideways glance what yardage they still have to gain and hence what plays they had better call, if the line-marker sticks invented by Walter J. Fitts of Mount Sterling, Ky., come into general use. For instead of blending dully with a confused background, as even white-painted sticks are apt to do, these new ones will shine like little pillars of fire.

In the Fitts invention, the sticks are made either of slotted aluminum tubing or of transparent plastic. At top and bottom are built-in flashlights, each with its own set of batteries. One set of batteries, the inventor reckons, should last through an ordinary game.

Mr. Fitts has just been granted U. S. patent 2,479,157.

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BIOCHEMISTRY

Proteins Differ in Sexes

➤ DARLING, you are growing old. By your amino acids, that is told. And what is more to the chemical point, a woman as she grows older has different amino acid content (protein, in more familiar language) than a man.

This difference between the sexes, explained to the American Chemical Society in Atlantic City, N. J., by a group headed by Dr. Philip G. Ackerman of Washington University School of Medicine, St. Louis, promises to help understand and perhaps treat some of the degenerative diseases in the aged—heart disease, arthritis, etc.

The concentrations of eight of the more essential amino acids, into which protein food is broken down in the human body, were measured in the blood plasma of

young and old individuals. In the case of six out of the eight chemicals, the change with age was different in the two sexes.

Although the amino acid pattern has not been related as yet to actual prevalence of disease, it is known that heart disease is more common among men and arthritis is more common among women. This suggests that the degenerative changes of aging may run a somewhat different course in men than in women.

Earlier studies by Dr. Ackerman and his colleagues, Lilli Hofstatter and William B. Kountz, showed that old people have a great need for protein foods, such as meat, eggs and milk. The general belief earlier was that old individuals did not require large amounts of protein, the food that goes to repair and build up muscle

GENERAL SCIENCE

Police State In Making?

Clearance procedures and restrictions to protect our war secrets may lead us toward laying the foundation for a police state, scientist warns.

➤ THE existence of mechanisms for a sort of industrial police state created in the interests of industrial and military security was evident in the American Chemical Society's discussions of security clearances for scientists in Atlantic City, N. J.

Some of these are

1 A white list called a central security file of all individuals, organizations, facilities, factories, etc. cleared by all military departments. A corresponding black list of those denied clearance undoubtedly exists in the FBI files.

2 A personnel security board and an industrial employment review board for the armed services which are the bodies that can deny security clearances.

3 Control of all visitors to factories and laboratories doing confidential and secret work for the armed forces.

Col. E. M. Tally of the Munitions Board told the chemists that "the American people are faced with a three-headed monster in providing security in industry for our defense trade secrets." The dangers are failure to protect trade secrets of defense, stifling production and scientific progress by too rigid control, and injury of the innocent.

Restrictions could be made so tight that no foreign agent steals our trade secrets, Col. Tally said, but this would deprive many innocent persons of their jobs and hamper production for defense.

The Army, Navy and Air Force by joint action are attempting to simplify the methods of protecting secret war production so that manufacturers follow the same rules for all government contracts, Col. Tally explained.

Because a large part of American industry is geared to military production in an emergency even if not actually working on secret war material now, some industries and research laboratories are making it the practice to clear all employees, especially scientists, so they can be available to do anything that the company needs done, even if they are hired for non-military work. This puts an increasing number of the scientists under military clearance control.

Even when a scientist or other employee is finally cleared, which is a matter of months of waiting in some cases, he may be subjected to further clearance procedures at the whim of some administrator. Dr. John A. Swartout, scientists' representative on the Oak Ridge review board, told the chemists that clearance should erase all doubt about a man's reliability unless there

is subsequent action on his part to raise the question of his loyalty.

It became known that wholesale clearances in the Department of Commerce have been ordered within the past few weeks, affecting even scientists originally cleared before the war and responsible for the creation of some of the most valuable and secret of the military devices and weapons. This is having a disastrous effect upon morale and operation of government scientific research.

Special steps are taken quietly to exclude from government and industrial laboratories many visitors, especially those from abroad, even when they have been invited by international organizations cooperating with official U.S.A. functions. Reports and publications presumably freely available and non-secret are also being withheld from "Iron Curtain" countries when it is known that is their destination.

Extension of the already gigantic government file of detailed information about individuals is feared by Dr. Swartout. A prior police investigation would be required for everyone upon whom public money is spent for education, if there were a logical development of the principle that Congress advocates in requiring clearance of all applicants for Atomic Energy Commission fellowships. Dr. Swartout pointed out. Next in line are the students of state universities and the families of students in our public schools, he suggested.

"The ultimate result is the establishment of the foundation for a police state," Dr. Swartout warned.

Science News Letter, October 1, 1949

PSYCHOLOGY

Ink-Blot Test Forecasts Approach to Research

➤ THE Rorschach test of personality, in which the individual tells what pictures he sees in ink blots, shows how a student will attack a research problem. This is the conclusion of Dr. Lee J. Cronbach, of the University of Illinois, after study of 75 graduate students in education at the University of Chicago.

The thinking habits which show up on the Rorschach test have their parallel in the performance on research, he found. The method of approach, accuracy, and organization on the test corresponds to the treatment of the research problem. And individual assets and limitations in

research are forecast in feelings of inadequacy, self-criticism and reaction to authority revealed by the personality test.

Dr. Cronbach reported the results of his studies to the American Psychological Association in Denver, Colo.

Science News Letter, October 1, 1949

CHEMISTRY

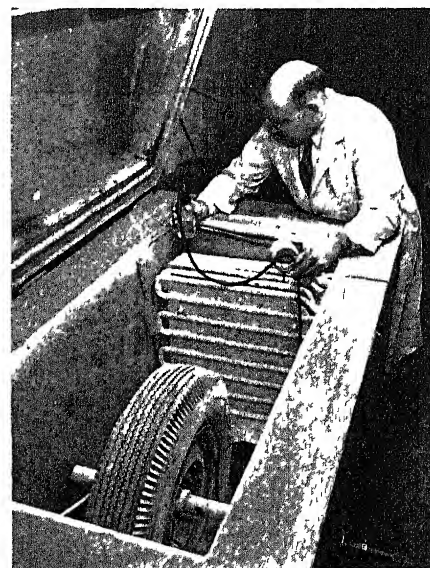
Synthetic Rubber Polymer Gives Arctic Weather Tire

➤ A NEW synthetic rubber polymer will make possible automobile tires which will remain in condition for use at temperatures as low as 75 degrees below zero Fahrenheit, the Firestone Tire and Rubber Company of Akron, Ohio, claims.

The amazing resiliency of this new Arctic rubber may enable engineers to solve innumerable problems in the operation of machinery, motor vehicles and aircraft at sub-zero Arctic temperatures, Raymond C. Firestone stated. Rubber tires, hose, gaskets and belting in the past have frozen as hard as rock at temperatures below minus 60 degrees.

Tests under extreme sub-zero laboratory conditions show two outstanding advantages in tires made with the new polymer. They do not stiffen so much that they develop permanent flat spots when parked, and treads do not harden and chip out. Mileage tests in Texas indicate that the rate of wear of this cold weather tire will be satisfactory under normal highway driving conditions.

Science News Letter, October 1, 1949



COLD WEATHER RUBBER—This deep freeze is used to test the resiliency of a new synthetic rubber polymer in tires. The tire is being checked for possible air leakage from a special test valve.

CHEMISTRY-AGRICULTURE

Water-Repellent Soil in Florida Groves Explained

➤ A BAFFLING soil condition of the Florida citrus groves that produces the equivalent of drought despite adequate rainfall has finally been explained.

The water-repellent soil, which "remains dry even after prolonged rainfall," is formed from magnesium used in fertilizer and an undetermined fatty acid in the soil, I W Wander of the Citrus Experiment Station, Lake Alfred, Fla., reports in *SCIENCE* (Sept 23). Citrus trees growing in this soil are unable to get the water, which they need in moderately large quantities. As a result yields of oranges, lemons, limes and grapefruit fall off considerably, just as they would under drought conditions. Since "water repellency" is widespread and quite pronounced in much of the citrus-growing area of Florida," both fruit growers and soil technicians consider it a matter of considerable economic importance.

The magnesium and the fatty acid form an insoluble substance that is almost identical with hard soap made in the laboratory. Soil experts who have not themselves experimentally verified the results advanced by Dr. Wander, find that they accord very satisfactorily with the known facts. They point out, however, that they give rise to an awkward situation. Obviously if magnesium were not used as a fertilizer, the formation of water-repellent soil would not occur. But magnesium is used very deliberately to supply a mineral which the soil lacks and which the fruit trees need. In spite of this, they believe that Dr. Wander's explanation will prove to be the first step in a solution of the problem.

Science News Letter, October 1, 1949

CHEMISTRY

Tungsten Filament in Bulbs Has Its Name Changed

➤ YOU may think that there is a tungsten filament in that incandescent lamp bulb you read by, but you are wrong. It is a wolfram filament.

By international action, the name of the metal and chemical element, tungsten, has been changed to wolfram, by which it has been known generally outside the USA. The symbol already was W.

This is one of six changes from American usage in element names that were made at the International Union of Chemistry meeting held last month at Amsterdam and reported to the American Chemical Society meeting in Atlantic City, N J.

Niobium replaces columbium, but beryllium is now official for the world instead of glucinium, a European usage. Lutetium is chosen over lutecium and protactinium over proto-actinium. Hafnium is also given approval.

Two elements discovered in atomic fission products have had their names respelled. Technetium for element 43 and promethium for element 61, which were spelled -eum.

Six other elements discovered during atomic bomb research have had the names given them by their American discoverers made official internationally. Astatine for 85, francium for 87, neptunium for 93, plutonium (from which atomic bombs are made) for 94, americium for 95 and curium for 96.

The United States was represented by Dr. Edward Wickers of the National Bureau of Standards on the commission on atomic weights and by Dr. Alexander Silverman of the University of Pittsburgh on the commission on inorganic nomenclature.

Science News Letter, October 1, 1949

OPHTHALMOLOGY

TV Fatigue May Be Boon In Eyesight Protection

➤ TELEVISION fatigue may be a "sight conservation boon," Dr. Benjamin Rones, eye specialist physician of Washington, D C., declares in the *SIGHT-SAVING REVIEW* published by the National Society for the Prevention of Blindness.

Serious eye diseases will be discovered earlier, when treatment will give better results, if TV fatigue leads people to seek medical attention earlier, Dr. Rones thinks.

Science News Letter, October 1, 1949

PSYCHOLOGY

"Rock a Bye Baby" May Delight Some, Irritate Others

➤ PSYCHOLOGISTS have disagreed about whether you should rock and caress the baby. The baby's side of the argument was presented before the American Psychological Association meeting in Denver, Colo., by Dr. Helen M. Wolfe, of the staff of the Association.

The child does not always want to be petted, Dr. Wolfe told the meeting. But there is little that he can do about it until he is big enough to escape in some way.

At the very earliest ages, he can cry if held too tightly, and he does so. A little later he can try to disengage the hands which are holding him.

But the child finds it difficult to escape until he can run fast, hit hard or use names.

If you insist on cuddling the baby when he is trying to get away, don't be surprised if he bites, hits or kicks you, Dr. Wolfe warns.

If you must pet him, try offering some activity with your caresses such as patting, games, tossing, singing, and so on.

And you will find that he will put up with your attentions more readily when he is sleepy.

Science News Letter, October 1, 1949



BIOCHEMISTRY

Green Chemical In Blood Studied

➤ A "BEAUTIFUL green" chemical exists in human blood. It may be involved in stopping the deadly action of poisons such as that from tetanus germs, cause of lock-jaw.

The name of the green chemical in blood is verdoperoxidase. It is found in the white cells of the blood which play an important part in the body's defense against germs and their poisons.

Verdoperoxidase, as chemistry students will recognize from the last part of its name, belongs to the class of chemicals known as enzymes. Most familiar enzyme to the layman is the pepsin of the digestive juice.

The green enzyme is one of three known to be in blood cells. Search for more knowledge about the known and unknown but suspected blood enzymes is going on in several laboratories. Dr. Britton Chance of the University of Pennsylvania School of Medicine told a conference on the National Blood Program of the American Red Cross in Washington.

The blood Americans give generously to the Red Cross for this program can be made more useful for saving lives and restoring health when scientists know more about its enzymes.

Science News Letter, October 1, 1949

METEOROLOGY

Rain Has Little Effect On Calming Stormy Sea

➤ RAINDROPS produce only "splash and surface effects" upon the sea, they do not calm it, scientists have found.

E. W. S. Ashton and J. K. O'Sullivan of the engineering department, University of Manchester, Manchester, England, found that from a great height a drop of rain splashes and spreads and thus has little effect in calming a stormy sea.

By dropping aniline dye drops into a glass-side vessel full of water, it was found that the lower the height from which they fall, the more likely they will be to transfer their momentum from the surface layers to the underneath layers.

From 26 feet, however, the drop appears to spread over the surface of the water, thus dissipating its energy. Consequently, the stored-up energy of the individual drop coming from a great height dissipates in shock and splash at the surface, they report in the journal, *NATURE* (Aug. 20).

Science News Letter, October 1, 1949



CHEMISTRY

Make Quartz Crystals That Improve on Nature

➤ QUARTZ crystals better than Mother Earth herself can make have been produced artificially in Bell Telephone Laboratories, the American Chemical Society meeting in Atlantic City was told.

Needed during the war and in peace in order to convert mechanical energy such as sound into electrical energy, essential in many devices including the telephone system, large synthetic quartz crystals will protect the nation against a shortage of natural crystals in case of another war.

The American development is based upon work done by Prof. R. Nacken of the University of Frankfurt during the war. The quartz is produced in solid crystalline form from liquid solutions at high temperatures and pressures. The method used is much like the growing of rock candy crystals from super-saturated sugar solution, except that the process is carried out at high temperature and pressure in a thick walled steel tube. The liquid used is a strong alkaline solution which dissolves silica, the compound of which quartz is composed.

The artificially grown quartz is clearer and freer from imperfections which are always found in natural quartz. Growth rates as much as a tenth of an inch in length during the day are possible.

Science News Letter, October 1, 1949

ENGINEERING

New Magnetic Tape Records Data in Flying Rockets

➤ A MAGNETIC metal tape six inches wide and 150 feet long, for installation in the nose of a guided missile to record data as the craft penetrates the atmosphere miles above the earth, was revealed by United Aircraft of East Hartford, Conn. It was developed for the Navy's Bureau of Ordnance.

The recording tape in the device is led into a armored cylinder that withstands the shock of dashing into the ground, in the exhausted rocket, with little or no injury. Conventional paper tapes do not stand the shock. The new magnetic tape recorder may replace methods now in use by means of which automatic radio signals are sent from the missile to the ground because this method requires elaborate ground and air equipment, and difficulties are often encountered in both transmission and reception.

This magnetic recorder weighs only 46

pounds, but is able to record 200 pieces of information simultaneously and continuously on its six-inch tape. Such factors as air pressure, temperature, speed and many others are recorded by electrical signals from a score of instruments. When the record cylinder is recovered after the crash, the steel tape is played back through a transcriber and the information plotted on charts.

The magnetic tape recorder was developed by Aimov Research Foundation of the Illinois Institute of Technology, Chicago, on sub-contract to United Aircraft Corporation as part of a guided missile project of the Navy Bureau of Ordnance. The project is cooperative, with the Massachusetts Institute of Technology acting as the technical control group for the associated manufacturers. These are United Aircraft, Bell Aircraft and Bendix Aviation Corporation.

Science News Letter, October 1, 1949

ELECTRONICS

Radio Microwaves Now Used To Measure Molecules

➤ RADIO microwaves, a fraction of an inch long, are being used to find the dimensions of certain molecules in gases and how fast they spin, General Electric scientists revealed in Schenectady, N. Y. The waves used vibrate about 24,000,000 times per second.

The technique used originated in 1933 by two University of Michigan scientists, according to Dr. A. Harry Sharbaugh, but did not become a practical tool until after the war. The recent great advances made in electronic devices for producing and controlling the tiny radio waves is accountable for the present practical development.

The waves are sent through a 16-foot rectangular tube containing the gas under study. Most of the time the radio waves pass through freely, but when they happen to be at one of the characteristic rates of the molecules, they are absorbed, and their energy sets the molecules into increased rotation. A dip in a horizontal green line on the face of a tube similar to that used to receive television pictures, watched by the scientists, shows absorption. Frequency is measured by comparison with a standard.

Dr. Sharbaugh explained that this microwave method of measuring molecules represents an important extension to the science of spectroscopy, used to study laboratory samples or the properties of distant stars. With visible light waves, about 50,000 to the inch, individual atoms can be studied. Infra-red waves, similar to light waves but invisible and longer, can be used in measuring molecules made of groups of atoms. The still longer radio microwaves yield data several thousand times more precise than those obtained with infra-red.

Science News Letter, October 1, 1949

ENGINEERING

Shock-Resistant Electron Tubes Being Developed

➤ RUGGED electron tubes for use in electronic equipment, that will withstand severe conditions of vibration, shock and acceleration, are under development at the National Bureau of Standards in Washington, D. C. Their development is an outgrowth of a project concerned with methods of testing tubes for sturdiness and durability.

Electronic equipment in various kinds of commercial, industrial and military applications is often subjected to severe mechanical abuse. Some tubes may have to withstand great extremes of temperature as well, but in any case the mechanical design of a rugged tube is strictly governed by the required electrical properties.

The first phase of the Bureau's work was a survey of actual operating conditions for electron tubes in various applications. Then came the development of equipment to reproduce the effects of the conditions encountered in use. The Bureau's facilities for testing the ruggedness of electron tubes now include vibration apparatus, mechanical resonance testers, high-impact shock machines, and high-speed centrifuges.

Vibrations produce the most common mechanical stress encountered by electron tubes under severe conditions, I. L. Cherick of the Bureau staff states. Continuous and intermittent vibrations are present in vehicles, in aircraft, on shipboard and in industrial applications. In motor vehicles the vibrations are usually of low frequency, but in aircraft they may range up to 10,000 cycles per second.

Science News Letter, October 1, 1949

BOTANY

Treeless Prairies Believed Created by Indians

➤ THE treeless prairies, with the grass that supported the great herds of buffalo when the Indians dominated America, were actually made to order by the Indians to suit their way of life.

This new idea that the wild west landscape, as discovered by the white men, was not the natural vegetation of that region was suggested by Dr. Omer C. Stewart of the University of Colorado to the Twenty-ninth International Congress of Americanists held in New York.

The Indians had the habit of burning off the prairies to create fresher pasture for the game they hunted and to keep the country open so that they could see the approach of hostile tribes. Dr. Stewart believes that trees might have grown upon the midwestern plains except for this periodical burning by the pre-Columbian Indians.

Science News Letter, October 1, 1949

CHEMISTRY

Orlon, New Synthetic Yarn

This new treatment of familiar fibers stands up better under sunlight. First commercial production is planned for next year.

By ANN E. EWING

See Front Cover

➤ ORLON, the new synthetic yarn made from natural gas, and oxygen and nitrogen from the atmosphere, will team up next year with such familiar fibers as nylon, rayon, silk and wool for shirts, undergarments, curtains and even men's suits. First commercial production—next year—however, will go largely to industrial users.

Particularly resistant to sunlight, materials of this new fiber lose only about one-fourth of their strength in tests where nylon, silk, wool and rayon fail completely.

Look for Orlon to be outstanding for umbrellas, awnings, sails, convertible tops, and other jobs where fabrics must stand up under severe outdoor exposure. Not only sunlight, but moisture, fungus and insects normally will attack these items over a period of time. They will not do so if the articles are made of Orlon.

Orlon approaches nylon in its strength and lightness. In most of its other properties including the final estimated cost, Orlon falls somewhere between nylon and rayon. Unlike nylon, however, which is rather cold and clammy to touch when wet, Orlon has a warm, friendly feeling, either wet or dry.

War Development

Orlon was first developed during the war as a possible product for use in the South Pacific. There other materials, excepting nylon, rotted away in hours or days.

Low specific gravity gives Orlon a high covering and bulking power, permitting the manufacture of lighter weight fabrics than usually obtained. These fabrics, however, have the appearance of appreciably heavier materials.

Orlon will not replace nylon for stockings, underthings and similar uses, although it will be made into woven lingerie, either in white or light pastel shades. This material is known as tricot because of the style in which it is knit. Orlon will supplement rather than compete with nylon in many fields.

The most important industrial uses for this new fiber, which will not be in commercial production until late 1950, are as filter cloths, nets for dyeing nylon hose, marine cordage and as dust filter bags. Orlon will be chosen not only because it is more successful in resisting weathering, but also in resisting alkalis and acids.

Orlon fiber in a continuous filament, that is one long thread, feels like silk. On the other hand, when Orlon is in the form of staple, it feels much like wool.

At first glance, a bit of Orlon staple looks quite like a tuft of cotton. Actually, it is made up of short lengths of thread which have been given a permanent wave.

Some Orlon staple has been made in experimental quantities. Production of a synthetic yarn in staple form is necessary to adapt it to machinery in existing plants.

Crimping gives to the staple the mass cohesion that is essential for good spinning in the wool, worsted and cotton mills now using the traditional fibers. No samples of Orlon staple are yet available, but they are expected after commercial production has started.

Orlon fiber is made from polyacrylonitrile. This is a plastic formed by the polymerization, that is linking together to form long molecules, of acrylonitrile. Acrylonitrile is made from such basic materials as limestone, coal, petroleum, natural gas, water and air.

Acrylonitrile is one of the intermediate products in making a certain kind of synthetic rubber. Known for its resistance to oil, this type became well known during the war as Hycor, Peibunan, Butapicene or Chemigum.

Because the quantity of synthetic rubber made in the United States each year is steadily increasing, the supply of acrylonitrile is ample. It is even possible that the production of Orlon from acrylonitrile will reduce the price of synthetic rubbers.

Making Acrylonitrile

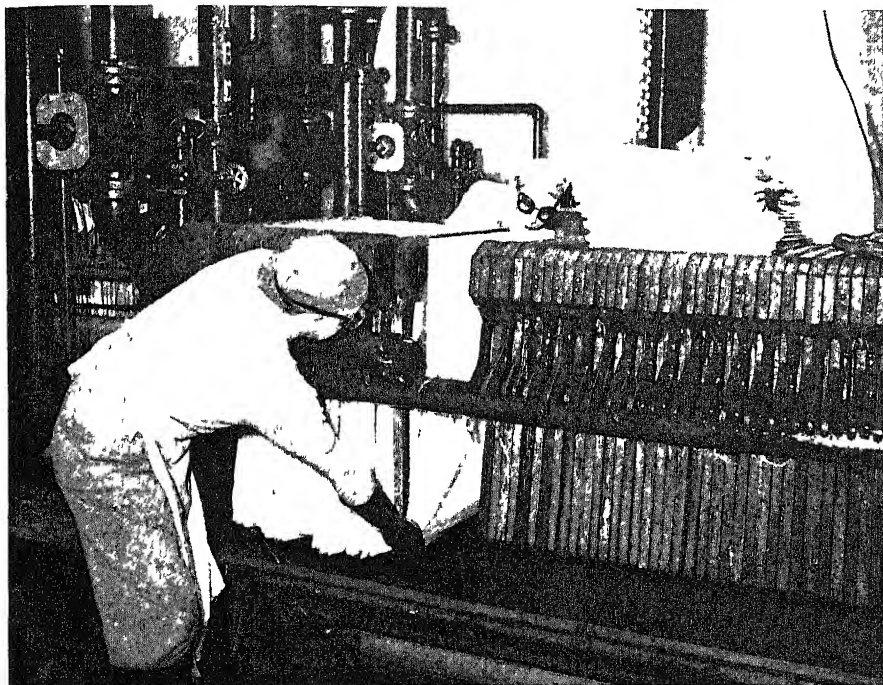
There are several ways to make acrylonitrile. One method is to start with ethylene, which is familiar as an anesthetic and as a compound used to hasten the ripening of fruits and vegetables. By reaction with oxygen from the air and hydrocyanic acid (prussic acid), the ethylene gas is changed into acrylonitrile monomer, which is a fairly volatile liquid.

Under the influence of catalysts, compounds which do not enter into reaction themselves but which help to make the reactions go, the acrylonitrile forms polyacrylonitrile.

Orlon as a fiber is quite similar to the fibers obtained when vinyl chloride, vinyl acetate and vinyl alcohol are polymerized.



NEW ORLON PRODUCTS—Fine marquisette for curtains which will not fade in sunlight, weather proof sail cloth, and strong, tough rope are some of the products which can be made of Orlon.



ON THE PRODUCTION LINE—Two men are adjusting the tension on Orlon filter cloths in this picture.

either by themselves or with each other.

Unlike wool, rayon or cotton, the entirely synthetic fibers usually absorb little or no moisture and are nearly as strong when wet as when dry. This property is particularly important in fabrics used outdoors.

Its low moisture absorption also makes Orlon fabrics easier to clean. Dirt does not become imbedded in the fiber and is, therefore, easier to remove.

The problem which now prevents even more widespread experimental use of Orlon is the difficulty of dyeing the fiber. Because it is chemically inert, it does not take too well to ordinary dyes and dyeing methods.

Only Pastel Shades

Orlon can be dyed, but the colors obtained are not too light-fast, and only pastel shades are available at the present time. The chemists at E. I. duPont de Nemours & Company, the company which developed Orlon, believe that by the time full scale production is achieved, the techniques of dyeing this new fabric will have been mastered.

This same difficulty with dyeing was encountered when the only other two all-synthetic fibers now in general use, nylon and Vinyon N, were first produced.

Synthetic fibers account for only one percent of the overall textile uses. Last year over seven billion pounds of fibers were consumed in the United States. Seventy percent of the total textile and cordage products are cotton.

Before considering the use of Orlon as a consumer fabric, the toxic properties of both the polymer from which the yarn is prepared and the yarn itself were thoroughly investigated. They have both been classified as non-hazardous, that is, no dermatitis or skin eruptions developed from the customary patch tests on hundreds of people.

At first, Orlon is expected to make its biggest impression on the curtain industry. It is highly resistant to light, smoke, and soot and gases from industrial plants as well as from heating units in the home itself.

When Orlon is in general use for curtains, the curtain stretcher can be put to good use training climbing rose bushes in the garden. Orlon retains its shape and friendly feel either wet or dry.

Protective work clothing is another field where Orlon is expected to find immediate acceptance. Workers in chemical process industries, rayon plants, garages and gasoline stations are seeking acid-resistant fabrics which will give better protection and safety to the worker and which will last longer. Tests have shown that Orlon answers these needs.

Men's shirts, both business and sports types, should last longer and be more easily washable in the home when made of Orlon, due to the fact that it is quick drying and needs no ironing. Shrinking will be a forgotten thing, since Orlon, like nylon, can be "heat set."

Decorative striping for the pin-stripes in men's woolen and woisted suits are, at the

present time, often made of acetate rayon. This fiber, however, has low strength and abrasion resistance. Orlon filament yarns, not colored by dye, would be an interesting substitute for acetate rayon in pin-stripes, and would not have these disadvantages.

One of the greatest difficulties in making Orlon fiber was to find a suitable solvent for polyacrylonitrile. Materials now used are organic compounds with such complicated names as dimethyl methoxyacetamide, tetramethylene cyclic sulfone, and meta and para nitrophenols.

The name Orlon as applied to a fiber does not refer merely to a single fiber or yarn but rather to various types of Orlon acrylic fibers. All of these fibers possess many of the properties of the original Orlon but have also distinctive characterizations of their own.

Science News Letter, October 1, 1949

ASTRONOMY

Soviets Discover New Comet, Fifth This Year

➤ SOVIET astronomers bulletined to the world discovery of a new comet at the same time that President Truman announced an atomic explosion in the USSR.

The new comet, fifth this year, was discovered by Dr. P. Shajn of Simers Observatory in the Crimea. It is too faint to be seen with the naked eye, being thirteenth magnitude, with a short tail.

The discovery was confirmed by Dr. D. J. Martynoff of Kasan Observatory, also in Russia, before it was reported to the Copenhagen clearing house for astronomical news and thence to Harvard Observatory for relaying to American observatories.

First American observation of comet 1949c was by astronomer Ernest G. Reuning at the U. S. Naval Observatory at Washington Sept. 23.

Located in the constellation of Cetus, the Whale, the comet is high in the night sky near the point where the ecliptic crosses the equator. It is moving slowly south. (On Sept. 24, 5 18.5 GMT, RA 5 min 48.4 sec Dec South 2 deg 7 min 32 sec.)

Science News Letter, October 1, 1949

SCIENCE FILMSTRIPS

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SUFFERN, N. Y.

MEDICINE

Beta Rays Cause Burns

➤ SEVERE burning of the hands is reported in four men who handled radioactive materials at the recent atomic tests at Eniwetok Atoll.

The damage was due to beta rays, which are composed of electrons, units of electricity. Although the materials they handled also emitted gamma rays which are like light waves or X-rays, there was no body damage beyond the local burns on the hands, a team of doctors at Los Alamos, N. Mex., reported in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Sept. 24).

The physicians are Norman P. Knowlton, Jr., Edgar Leifer, John R. Hogness, Louis H. Hempelmann, of the Los Alamos Scientific Laboratory, and Drs. Loren F. Blaney, Dan C. Gill, William R. Oakes, and Charles L. Shafer of the Los Alamos Hospital.

The patients, in order to speed their work, had discarded the handling devices provided; it was discovered, and used rubber gloves or bare hands to work the materials. Exposure time in all was from 40 to 60 minutes.

The physicians describe four definite phases which resulted from the burns. In the first phase, the patient had a sensation of tingling and itching of his hand while handling the radioactive materials. This was shortly followed by a reddening and swelling of the hand with blanching of the skin in some areas. In the second phase, there was a period of three to five days when the symptoms decreased. In the third phase, which lasted about three weeks, the reddening of the hands spread and blisters formed. These were painful and required draining. The skin then peeled off and left a new layer of skin which was thin and tight with a shiny appearance. During the fourth phase, which is also the chronic stage of the disease, ulcers formed which would not heal and required grafting of the skin. Also, there was noted wasting and loss of soft tissue in the fingers with loss of power to move the fingers in some cases.

Other effects noted were damaged blood vessels in the burned area, retarded growth of nails, loss of hair on the back of the fingers and a stoppage of perspiration in the palms.

Treatment consisted of ice packs to cool the hands, cutting out the unhealed areas and skin grafting. Besides this, the patients were given rutin, for strengthening the walls of blood vessels, a high protein diet, several necessary vitamins and penicillin to check further infection.

The physicians point out that these patients had just entered the fourth stage of the disease and their progress would have to be followed for a few years. The danger they fear is that some malignant changes may occur.

"It is hoped," they state, "that by calling attention to the early signs and symptoms of injury by beta radiation, overexposure will be recognized and hazardous operations discontinued before more damage is incurred."

Science News Letter, October 1, 1949

MEDICINE

Report Method for Finding Early Inaccessible Cancer

➤ A METHOD for detecting cancer of certain organs playing an important role in digestion and the secretion of body juices before it reaches the hopeless stage is reported by Drs. Henry M. Lemon and Walter W. Byrnes of the Boston University School of Medicine and Boston City Hospital.

Each year about 10,000 people die of cancer of the liver, the bile ducts leading from the liver and the pancreas. Although cancer in these areas accounts for only 5% to 10% of all cancers, the death toll

is high because this region is hard to get to, the physicians declared in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Sept. 24).

They suggest that at the first sign of upper abdominal pain or jaundice the following technique should be followed. A tube be inserted down into the duodenum, which is the first part of the small intestine, and the fluid removed by suction. After the fluid has settled, the cells obtained from it are smeared on slides and stained. Cells which are characteristic of cancers can thus be identified because they usually show more and larger nuclei to the protoplasm than in normal cells.

Drs. Lemon and Byrnes do point out that it is not possible to identify the origin or type of cancer by this method. But they were able to diagnose cancer in patients who came ill to the hospital which was confirmed when the patients died. In their experience, the patients they diagnosed had come too late for treatment.

This study was supported in part by a grant from the U. S. Public Health Service.

Science News Letter, October 1, 1949

GENERAL SCIENCE

Giveaways to New Babies Hit by Hospital Bureau

➤ GIVEAWAYS are now slapped down by a hospital organization. The giveaways in this case are being operated not over the radio but through hospital staffs as a "service" to mothers who receive a gift package of baby items while still in the hospital.

This promotion scheme puts the hospital in the position of "endorsing several commercial products which may or may not have real merit," declares the Hospital Bureau of Standards and Supplies in New York.

Advantages to the manufacturer are, having his product sampled and getting weekly lists of the families supplied including the babies' first names for personalized direct mail pieces.

The scheme will "lower the professional standing of hospitals in their communities," the Bureau warns its members.

Now in operation in New York, covering 53 hospitals and 52% of the births, the scheme will be in Philadelphia next, then in Baltimore, Boston, Chicago, Pittsburgh, Cleveland and Cincinnati.

The Hospital Bureau is a non-profit, co-operative buying organization operated by and for voluntary hospitals.

Science News Letter, October 1, 1949

The so-called "enrichment" of flour, required during the war and now still widely followed, means the addition of very small quantities of iron and the synthetic vitamins, niacin, thiamine and riboflavin.

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MEDICINE

Hunt Mice To Aid Cancer

➤ A WILD mouse hunt, to aid the fight against cancer, will soon be on in cities and villages all over the nation. The mouse hunters will be the quarter of a million high school boys and girls who are members of Science Clubs of America, sponsored by Science Service.

When they have found the mice, the high school students will breed and study them in cooperative research with the Roscoe B. Jackson Memorial Laboratory, Bar Harbor, Me., world famous center of cancer study and mouse breeding for scientific research.

The wild mouse research project will contribute directly and importantly to the discovery of new scientific facts about cancer, Dr. Clarence C. Little, Jackson Laboratory director, declared.

The project is being organized by Dr. Little, Watson Davis, director of Science Service, and Dr. Elizabeth Russell, who is in charge of Jackson Laboratory's inbred strains of mice that are the backbone of scientific and medical research throughout the country.

This new pioneer project should prove both exciting and fruitful, judging from experiences with previous cooperative projects.

the young people in Science Clubs have carried on with the U. S. Weather Bureau and other national institutions.

"The students," Mr. Davis said, "will have fun doing it and at the same time will be learning actual techniques that will prepare them for work as research scientists in later life. They will have the satisfaction of making a positive contribution of lasting value to science."

The grasshopper mouse, the red backed mouse (a forest type), the jumping mouse, the harvest mouse and the lemming mouse are among the 13 genera the high school boys and girls will hunt. None of them has been of any use to man and ordinarily they are considered pests. Information about cancer in them is practically unknown to the scientific world.

"This search for new animal material," Dr. Little said, "will constitute the first cooperative attack between a scientific research laboratory and high school students on problems of cancer research."

"The work being undertaken is not being duplicated anywhere," he explained. "The students will not be engaged in routine confirmation of known facts but in actual exploration into a field not now covered."

The Jackson Laboratory will provide instructions for trapping, information on food and life habits, data on recognition of interesting variations in form and color, as well as directions on how to recognize external cancer in living specimens or to diagnose it at autopsy.

The students will not be in any danger of getting cancer as a result of taking part in the project. Dr. Little emphasized that the project is absolutely safe, provided instructions are followed.

The project is open to any member group of Science Clubs of America. Groups of students, not affiliated but wishing to take part, may get complete details about joining at no cost by writing to Science Clubs of America, 1719 N. St., N. W., Washington 6, D. C.

Science News Letter, October 1, 1949

tion and is for use of the U. S. Bonneville Power Administration. It will take a current of 230,000 volts and cut it to 115,000 or 57,000 and 13,200 volts, and will be ready for delivery in 1951.

Science News Letter, October 1, 1949

Words in Science— FROST-RIME

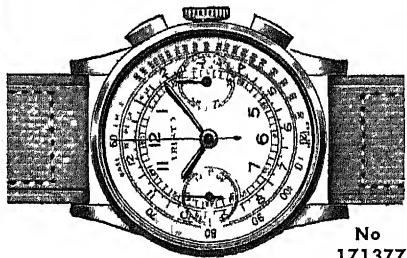
➤ FROST and rime are both feathery, white formations on objects in the winter landscapes. But they are not the same thing.

Frost forms when moisture in the air passes directly from the gaseous to the solid state and forms ice crystals on a cold surface. It is not frozen dew, which is moisture that has condensed into liquid on contact with a cool surface. The frost does not pass through the liquid state at all but forms ice directly. The same process that causes dew and frost causes the "sweating" of ice water glasses on a hot summer day.

Rime is formed from freezing fog or mist and is deposited on the windward side of objects. Rime may form either by day or by night.

Science News Letter, October 1, 1949

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SCIENCE SINCE 1500

By H. T. Pledge

Librarian, Science Museum of London

"A thorough-going history of science. The author takes the subject and the reader in his stride on a journey which must be ranked as a very able performance, indeed. The illustrations are excellent, the bibliography is unusually helpfully arranged, and the indices are full and satisfactory."—*The N. Y. Times*

"A remarkably complete account of mathematics, physics, chemistry, and biology, based on careful scholarship."—*The Manchester Guardian* \$5.00

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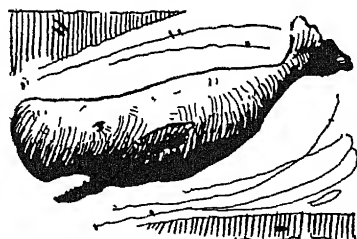
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ENGINEERING

Portable Transformer Stand-In for Damaged Ones

➤ A PORTABLE transformer of high capacity is to be available for temporary use at sites where needed in Portland, Ore., and at Seattle. It will be kept mounted on a railroad car, ready for immediate transfer to a point where a permanent transformer is in need of repair.

This transformer, a device to cut high voltage to the strengths more ordinarily used in distribution lines, will be constructed by Westinghouse Electric Corpora-



Unseen but Important

➤ ISN'T it odd, how all animal life in the sea is dependent on tiny plants invisible to the naked eye!

Vast mountains of these algal cells are accounted for in the more usual cycles of eat-and-be-eaten represented by practically all fish, crustaceans, dolphins, seals, whales, as well as less familiar creatures such as jellyfish, starfish and sea urchins, octopuses

and cuttlefish—all the larger carnivora and scavengers that swim the sea and crawl on its bottom

Each of these creatures eats other animals a little smaller than itself. These in turn prey on still others that are a step smaller, until at last we get down to the ultimate feeders on the one-cell algae—animals that are microscopic themselves. There may be a dozen or a score of digestive steps between diatom and whale.

That pyramiding of hunger's holds true specifically for the sperm whales, the only whales that eat really large bites. With their enormous jaws and stumpy teeth as big as pint jars, sperm whales rend and devour the pink flesh of the giant cuttlefish that live in the great dark depths. These cuttlefish are in turn devourers of anything they can touch with their anaconda-like arms, including many really large fish. The big fish in turn are eaters of smaller fish, and the smaller fish feed on still smaller ones. The smallest fish eat tiny shrimp-like creatures, marine worms, swimming mollusks, and so on. These, finally, make the ultimate food-demand

upon the one-celled algae, the humble grasses of the sea.

Whales, partly because of their huge size, partly because of the mystery that still surrounds much of their lives, give dramatic emphasis to the struggle for food, the compounded tragedy of eat-and-be-eaten that goes on incessantly in the sea. But it must be remembered that on smaller scale it is repeated in the life of every fish down to the smallest minnow, every squid and cuttlefish, every oyster and clam, every sea animal that eats other sea animals.

Hence the anxious preoccupation of sea scientists with the microscopic algae. With all the care and ingenuity that agronomists bestow on questions of soil fertility, rainfall, growing temperatures, and all other factors that make for success or failure in the production of land crops and pastures, the oceanographers study the conditions that influence the lives of these humble plants that are the foundation of whatever men take out of the sea with hooks, or nets, or harpoons.

(Reprint from *SNL*, Sept. 14, 1940)

PHYSICS MATHEMATICS

Earth's Magnetic Field

➤ THE gravity pull of the earth as it spins on its axis may be what gives the earth its magnetic field and makes compasses point to the north.

This simple explanation for one of the baffling and important problems of modern science is given by Dr. Antonio Gao of Lisbon, Portugal, in the scientific journal, *PHYSICAL REVIEW*.

The new explanation of the earth's magnetism is based on Dr. Gao's "unified field theory." Scientists following this explanation do not need to assume that the core of the earth is a giant magnet or that the ionosphere and atmosphere have impossibly great circulating electric currents.

Beginning with a study of the natural geometry of our familiar three-dimensional space plus time, and by wrapping another fifth dimensional space around it, Dr. Gao finds that the gravitational effects explained by Einstein have a close parallel in the electrical effects of the new geometry and that the two are necessarily closely related.

Behind the complexities of Dr. Gao's mathematics is the fact that the familiar effects of gravity are due to the curvatures of our space-time as seen from within our universe. But electric and magnetic effects come from curvatures that can only be appreciated by a mathematician or by some five-dimensional being looking at us from outside of our universe.

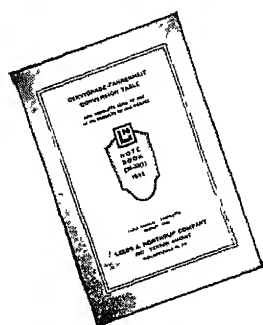
The magnetic fields of the earth, sun, stars and the neutron all receive a direct explanation by the new theory. In the case of the earth, assumed to be a rotating mass

containing no permanent magnets, the magnetic field that points compasses to the north appears as a natural consequence of the rotation. In addition, there appears at the same time an apparent electric charge on the earth.

In the case of some massive rotating stars, Dr. Gao surmises, this electric charge of the star might become great enough to make the star into a giant particle accelerator or "atom smasher" which can throw atomic fragments out into space with the great energies of cosmic rays.

Those stars with the peculiar variable magnetic fields recently observed are explained by the theory, as well as the more familiar Coulomb electrical forces well-known to physics students.

Science News Letter, October 1, 1949



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CHILDREN WITH MENTAL AND PHYSICAL HANDICAPS—J F Wallace Wallin—*Prentice-Hall*, 549 p, illus, \$6.65 A reference book for professional workers in fields of special education, child guidance, pediatrics, etc Based on first-hand experience in the treatment of the handicapped

CONDITIONED REFLEX THERAPY The Direct Approach to the Reconstruction of Personality—Andrew Siler—*Creative Age Press*, 359 p, \$3.75 Presenting a method of psychotherapy which the author believes will supersede psychoanalysis He sees hypnosis as a form of conditioning

DESIGN OF AN ULTRAVIOLET ANALYZER—Gilbert Kiverson, J J Osmun, and E W Jones—*Mellon Institute*, 5 p, illus., paper, free upon request to publisher, University of Pittsburgh, Pittsburgh 13, Pa.

FARMER VICTORIOUS Money, Meat and Mother Earth—William J Hale—*Coward-McCann*, 241 p, \$3.00 On the anticipated effects of chemistry on society

THE FEMALE EXTERNAL GENITALIA OF THE SPOTTED HYENA—D Dwight Davis and H Elizabeth Story—*Chicago Natural History Museum*, 7 p, illus, paper, 15 cents Description and illustration of the unusual organs of the female hyena which in young animals are strikingly similar to the male's

IMPROVING POULTRY THROUGH THE NATIONAL POULTRY IMPROVEMENT PLAN—Paul B Zumbro, Melvin W Buster, and J D Sykes—*Govt Printing Office*, 18 p, illus, paper, 10 cents

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MEMORIES OF EIGHTY YEARS—James B Herrick—*University of Chicago Press*, 270 p, illus, \$5.00 The autobiography of a noted physician

MODERN COLLEGE GEOMETRY—David R Davis—*Addison-Wesley*, 238 p, \$4.50 For prospective teachers of mathematics

NOTES ON SOME VERACRUZ BIRDS—Melvin A Taylor, Jr—*Chicago Natural History Museum*, 7 p, paper, 10 cents Notes made by the author in the course of identification of a collection of birds made in Mexico.

PHYSIOLOGY IN DISEASES OF THE HEART AND LUNGS—Mark D Altschule—*Harvard*, 368 p, \$5.00 For third and fourth year medical students

THE PLANT ALKALOIDS—Thomas Anderson Henry—*Blakiston*, 4th ed, 804 p, \$14.00 The chemistry of these important drug plants and also their physiological action

POLLIN-SLIDE STUDIES—Grafton Tyler Brown—*Thomas*, 122 p, illus, \$6.00 If you are one of the army of hayfever sufferers, you will be interested in seeing such a lifelike portrait of your particular enemy as is portrayed here This book is intended to enable any allergist or technician to identify and count the important pollen grains and fungus spores in the air

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PRESERVING BIRDS FOR STUDY—Emmet R Blake—*Chicago Natural History Museum*, 48 p, illus, paper, 30 cents A simply and clearly prepared handbook telling how to prepare birds for the museum.

PRINCIPLES OF FIELD CROP PRODUCTION—John H Martin and Warren H Leonard—*Macmillan*, 1176 p, illus, \$6.00 A college text for agricultural students

PRINCIPLES OF ORGANIC CHEMISTRY—John Leo Abernethy—*Saunders*, 317 p, \$4.00. A textbook for the beginning student

QUANTITATIVE CHEMICAL ANALYSIS—George L Clark, Leonard K. Nash, and Robert B Fischer—*Saunders*, 448 p, illus, \$4.25 An introductory text for chemical and non-chemical students, including pre-medical, home economics, agricultural and engineering students

REPORT TO THE UNITED NATIONS—United Nations Educational Scientific and Cultural Organization (Columbia University Press), 176 p, paper, 80 cents, An annual report of the activities and programs of UNESCO

REPORTS OF COMMITTEE ON ROADSIDE DEVELOPMENT AND SPECIAL PAPERS—*Highway Research Board*, 154 p, illus, paper, \$1.50 Telling how to make the roadside beautiful, prevent erosion, and so on

ROSE'S LABORATORY HANDBOOK FOR DIETITICS—Revised and Rewritten by Clara Mae Taylor and Grace MacLeod—*Macmillan*, 5th ed, 358 p, \$5.00 A text and reference work for hospital dietitian and community and public health nutritionist

SAFETY THROUGH ELEMENTARY SCIENCE—*National Commission on Safety Education and National Science Teachers Association*, 40 p illus, paper, 50 cents What young boys and girls should know for the safe use of their toys and other equipment in home and school

SCIENCE AND THE MORAL LIFE—Max C Otto—

New American Library, 192 p, paper, 35 cents A philosophical work consisting of selections from the writings of a philosopher of the Midwest

THE SCIENCE OF CULTURE A Study of Man and Civilization—Leslie A White—*Farrar Straus*, 444 p, illus, \$6.00 A professor of anthropology at the University of Michigan views man and the world in which he lives, describing his views as "culturalism"

SOME LOWER HURONIAN STROMATOLITES OF NORTHERN MICHIGAN—Eugene S Richardson, Jr—*Chicago Natural History Museum*, 15 p, illus, paper, 30 cents

STANDARDS AND LABELS FOR CONSUMERS' GOODS—Jessie V Coley—*Ronald*, 556 p, illus, \$5.00 What to look for when you go shopping

STATE PLANNING AND ECONOMIC DEVELOPMENT IN THE SOUTH—Albert Lepiowsky—*National Planning Association*, 193 p, \$3.00 A Report of the NPA Committee of the South

THE SUPERVISOR'S MANAGEMENT GUIDE FOR ALL WHO SUPERVISE OTHERS—M Joseph Doohar and Vivienne Marquis, Eds.—*American Management Association*, 190 p, paper, ring binder, \$3.50 A human relations guide for foremen and supervisors dealing with such topics as morale, absenteeism and leadership Contains a self-analysis quiz

TISSING MILK AND CREAM—Philip A Wright—*Govt Printing Office*, 46 p, illus, paper, 15 cents A guide to dairy-plant operators

UNIVERSITY PHYSICS Complete Edition—Francis Weston Sears and Mark W Zemansky—*Addison-Wesley*, 848 p, illus, \$6.00 For students of science and engineering for whom calculus is still a new tool

Science News Letter, October 1 1949

HOME ECONOMICS


Frozen Drink Tastes Like Fresh, Juicy Apples

► AN apple drink, tasting not like cider but like fresh apples, has been developed by Dr W V Cress of the University of California, Berkeley, Calif

Similar to the orange, lemon and grape juice concentrates now available, the frozen apple juice will be made cold and fresh at home by mixing three cans of water with one of the concentrate

Science News Letter, October 1, 1949

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✿ **WRIST CAMERA** straps on the wrist like a watch and uses either black and white or colored film. Called the first domestic magazine load miniature camera, it is made of lightweight plastic. Accessories include viewer, wrist band, case, and 14 frames of 16-mm film.

Science News Letter, October 1, 1949

✿ **BONDING SOLUTION**, for mounting photographs, withstands such severe tests as soaking in water for two days and long exposure to the heat of the sun. It is based on Vinylite resin, and contains nothing that will have any ill effect upon any photographic paper.

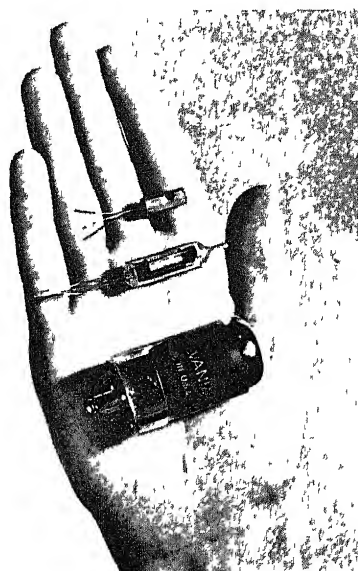
Science News Letter, October 1, 1949

✿ **PORTABLE**, 50-pound, electric power supply unit, which provides a well-regulated source of direct current at loads from 200 to 300 milliamperes, is suitable for laboratory, broadcast, and industrial applications. Optional carrying cases have been designed for the television trade.

Science News Letter, October 1, 1949

✿ **TROUSERS** for winter wear have cuffs, recently patented, which bulge out over the ankles but are strapped to the leg above and below. Each cuff is made of four hexagonal pieces, with side seams aligned with the side seams and the notches of the trousers legs.

Science News Letter, October 1, 1949



✿ **GERMANIUM** crystal mixer, for use in miniaturization in radio circuits, is shown in the picture where it is contrasted in size with more ordinary mixer tubes, including one of standard and one of sub-miniature types. It is a four-terminal type.

Science News Letter, October 1, 1949

✿ **WINDOW BALANCE**, recently patented, is a friction device to take the place

of the common weight balances in a window sash, and can be used in old or new construction. It consists of a plate with an adjustable side spring which can be fixed over the rope groove in the edge of the sash.

Science News Letter, October 1, 1949

✿ **THREE-SPEED** fishing reel, suitable for almost all salt-water fishing reels, has a gear shifting unit which gives no interference to free-spool or star-drag operations. The combination of speeds desired can be obtained by proper assembly before starting for fishing.

Science News Letter, October 1, 1949

✿ **FROZEN COFFEE** concentrate, in five-ounce cans, will soon be available on the market. It will provide housewives with hot coffee at about five cents a cup. It is a product of the company responsible for the nation's first fully automatic hot coffee vending machine.

Science News Letter, October 1, 1949

✿ **ADVERTISING** attachment, a small aluminum frame with an enamel finish and a glass front and rear, is easily fixed in place on the top of the parking meters now common on city streets. Advertising cards are inserted between the glass plates, bringing additional income to the city.

Science News Letter, October 1, 1949

Do You Know?

European silk is produced largely in Italy.

Alaskan fur-seals live in "rookeries," with 35 to 40 females under the domination of one old bull.

Carrots actually build up their supply of the valued food element, carotene, during winter storage.

No single adhesive has been developed that will satisfactorily bond all types of materials.

The twin cities, Fort Williams and Port Arthur on the north shore of Lake Superior, are together called the *grain-shipping capital* of the world.

The "non-farm use" of fertilizer in the United States amounts to about 240,000 tons, its applications are on lawns, home gardens, golf courses, cemeteries and city parks.

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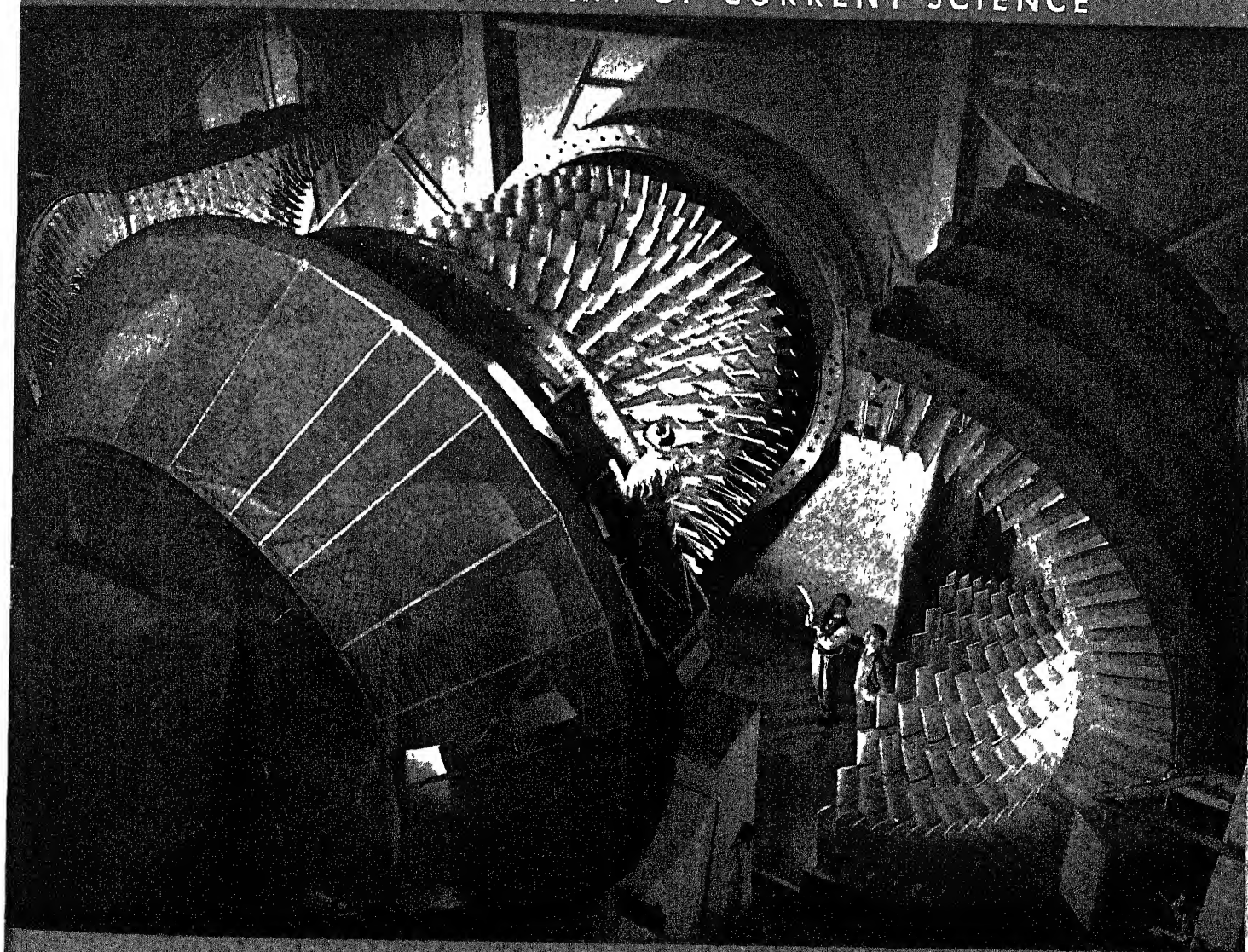
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OCTOBER 8, 1949

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



Mammoth Air Compressor

at the University of Chicago

See Page 230

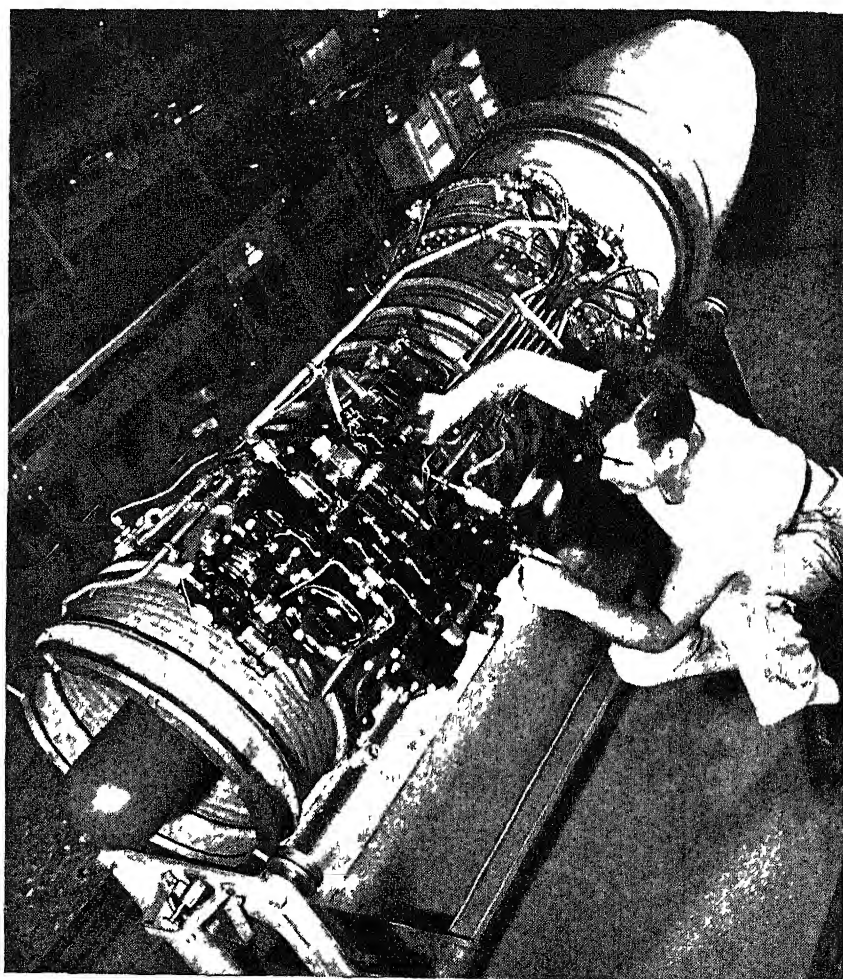
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ground of experience, technical knowledge and creative skill, gained through constant research for more efficient, economical sources for power, has Westinghouse been able to attain the eminent position it holds as a leading creator and producer of power for land, sea and air.

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GEOLOGY

Mineral Wealth Detection

A new technique, which can predict accurately what metals and minerals can be gotten out of the earth, has been developed. It can penetrate "iron curtains" abroad.

➤ A METHOD of predicting accurately what mineral riches can be mined from the earth, both here and abroad, even before ore deposits are exploited or discovered, has been developed by S. G. Lasky, chief of the mineral resources section of the U. S. Geological Survey, Washington.

The new technique, revealed to the 75th anniversary celebration of the Colorado School of Mines, Golden, Colo., promises to be useful in the "cold war" as a means of telling what metals and other minerals foreign nations can produce.

Already successfully tested on such diverse deposits as gold, copper, silver, nickel, vanadium, phosphate and manganese, the Lasky method uses a consistent mathematical relationship between the grade of the ore and the tonnage mined.

"Mining geologists have long appreciated that in many deposits there is a gradation from relatively rich to relatively lean material," Mr. Lasky said. "Tonnage increases as grade decreases."

Finding that no one had determined the precise relationship, Mr. Lasky discovered a consistent relation between tonnage and grade according to the classical equation of analytical geometry x equals a plus b times $\log y$. Applied to minerals, the grade is x and the tonnage is y , while a and b are constants that vary with the kinds of deposits.

What we can get out of the earth can

now be predicted even before the deposits are fully known. The new formula has been fruitfully applied to manganese in Arizona, vanadium and phosphate in Idaho and Wyoming, gold in Alaska, and to nickel deposits.

"Iron curtains" can be penetrated and U. S. experts have more hope of determining just how much manganese is likely to be mined in Russia, India or South Africa, how much platinum in Russia and Canada, tin in Malaya and Bolivia, etc.

The new resources studies by this and other methods can help us to determine where to turn now that Russia has cut off manganese exports, and a Spanish-Italian cartel has increased mercury prices to unprecedented levels.

It will be profitable for us to appraise our mineral wealth, Mr. Lasky warned the mining engineers and geologists. But present knowledge is inadequate as less than a tenth of our country is mapped on a scale satisfactory as a basis for search and appraisal.

Whether the Lasky method of mineral reserves can be applied to uranium, the atomic bomb metal, is not known, and it was not discussed by Mr. Lasky. Uranium mining has been on a relatively limited scale, production figures are held secret by all nations now, and geologists are unlikely to make any public predictions.

Science News Letter, October 8, 1949

surface obtained is in the polished base metal, not in a deposited coating of a different metal.

Science News Letter, October 8, 1949

RESOURCES

Oil Drought in 15 Years; Industry Seeks Substitutes

➤ AMERICAN oil reserves will run out in 15 years and against that day the petroleum industry is spending large sums to develop synthetic fuels, a research director declared.

However, the switchover to synthetic gasoline is not imminent because when natural petroleum is exhausted shale oil and coal should supply our needs for upwards of a thousand years. These oil industry prospects were described by C. K. Viland of the Tide Water Associated Oil Company, Martinez, Calif. The occasion was the seventy-fifth anniversary of the Colorado School of Mines, held at Golden, Colo.

Of the \$100,000,000 that is spent each year on petroleum research, Mr. Viland said that "a fair share" is presently spent on experimental work with synthetic fuels. The industry intends to "take the leadership in developing methods for making fuels and lubricants from sources other than crude oil in the future."

Although the American oil reserve is only "equal to about 15 years' current usage," Mr. Viland pointed out that "Colorado oil shales can produce at least an-

CHEMISTRY

Bright Finish for Metals

➤ BY merely dipping in a chemical solution some metal products are given a bright, reflective finish without mechanical polishing by a new process developed by Battelle Memorial Institute in Columbus, Ohio. The method will be known as chemical polishing.

Its chief advantage in production is its simplicity. Items of intricate form can be quickly polished to a high mirror-like luster by this dip treatment. The surface obtained may serve as the final finish surface or as a base for subsequent plating. A 50% reduction in finishing costs over ordinary mechanical or electrical polishing may be possible with the new process.

It works best on nickel silver, copper alloys, especially 70-30 brass, Monel metal, nickel or aluminum. It can not be used on steel, stainless steel or die cast metals.

The baths into which the metal parts are

dipped for chemical polishing contain a mixture of acids, the basic ones being phosphoric, nitric and acetic acids. They operate at ordinary room temperatures and up to 200 degrees Fahrenheit. At the lower temperature, action in the bath is slower and longer immersion is required. Immersion periods vary from 10 seconds to 10 minutes, depending on the initial finish of the surface being treated, the final finish required, and the operating temperature of the bath.

Following the dipping, the work is rinsed and dried. If it is desired to plate over the chemically finished surface, this can be done without further treatment of the surface.

The chemical polishing process has already been well tested on many metal products. Those successfully polished include brass, copper, nickel-silver, Monel, nickel and aluminum. The action in each case is a true polishing action and the reflective



"CHEMICAL POLISHING"—In a test of the new process, a spoon which has just been polished experimentally by dipping in a chemical polishing bath is rinsed prior to inspection of its surface.

other 100 years' liquid fuels supply" Fuel can also be extracted from coal "and U S coal deposits contain enough energy for perhaps 1,000 years at the present rate of consumption," he added

To the industry that supports it, research pays big dividends, Mr. Viland said. He cited one company which "has realized a profit of \$15 for each \$1 spent"

Science News Letter, October 8, 1949

MEDICINE

Childhood Ills Hit Aged

► CHILDHOOD diseases, so called because they primarily attacked infants and children, are now shifting their attack to the oldsters in our population

This paradox of an increasing infectious disease death rate among the aged at a time when such deaths are becoming almost rare among children is most dramatically emphasized by a series of cases of diphtheria. They are reported by Dr. Henry D. Brainerd of the University of California Medical School in *GERIATRICS*, scientific journal on diseases of old people.

Diphtheria from time immemorial has been considered a childhood disease. In the past it has been widely believed that 80% of diphtheria cases occur among children less than 10 years of age.

Yet among 147 unselected cases of diphtheria treated in the San Francisco City and County Hospital, almost one-third were over 45 years of age. This, the physicians pointed out, is only one instance of accumulating evidence that diphtheria is increasing proportionately as well as numerically among the aged.

This increase can be accounted for by surveying recent medical history, the physician said. Until 20 years ago diphtheria immunity was acquired by exposure to the disease, either with or without subsequent illness. After that time immunity was acquired by artificial immunization of children.

But many people who grew up before artificial immunization must have failed

to gain natural immunity, and they are now contracting the disease in their later years.

Further, diphtheria is more deadly to the elderly than to younger people, though the infection itself appears not to be more serious. The difference seems to be that elderly people are more susceptible to the toxins which cause death. Mortality among the San Francisco group was 29.9% among those over 45, and 17.3% among the younger group.

The physicians also included a group of patients with pneumonia and one with meningitis. Again, the infections appeared not to be more severe among the aged, and the antibiotics were able to knock out the infections among the aged as readily as among the young.

But the handicap of damaged hearts, lungs, kidneys and other organs which accumulate among the aged appears to make survival more difficult for this group. In lobar pneumonia only 4.8% of those below 45 years of age succumbed, in contrast to 29.3% over 45 years of age. The contrast was even greater in broncho pneumonia, the mortality being 60.8% for those over 45 and only 9.6% for those under 45.

Dramatic contrasts were presented also among the meningitis groups. Five times as many persons over 45 died of meningococcal meningitis as in the younger group, while in pneumococcal meningitis the ratio was two to one.

Science News Letter, October 8, 1949

GENERAL SCIENCE

Famous Mansion Given To Scientists

► ONE of New York's famous mansions, just off Fifth Avenue is the new home of the New York Academy of Sciences.

Given to this 133-year old science body by Norman B. Woolworth, it is expected to become an important center of science.

Science News Letter, October 8, 1949

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What cause and cure have been discovered for a disease in pigs? p. 233

ASTRONOMY

Soviet Astronomy Attacks

Abuse heaped on Western astronomy by Soviet non-scientist faction is a method of keeping communistic doctrine alive in Russian astronomy, expert declares.

➤ A SMALL group of non-scientist "outsiders" whose "mumbo jumbo" has the support of the Soviet government is to blame for recent Russian attacks on Western astronomy, believes a Russian-born astronomer.

Dr Otto Struve, honorary director of the University of Chicago's Yerkes Observatory, Williams Bay, Wis., and the McDonald Observatory of the University of Texas, Mt Locke, Texas, told Science Service that abuse is being heaped on Western astronomy and astronomers by Soviet officials appointed to keep communistic doctrine alive in Russian astronomy.

Rarely trained scientists, these government-backed outsiders to the field, "have not enough knowledge to coordinate the antiquated scientific views of Marx, Engels, Lenin and Stalin with reality," Dr Struve declares.

To combat "the threat to science" in this development, Dr Struve urges that American astronomers prepare for publication "a more or less official statement to give voice to the American point of view." He proposes that the statement be drafted by a committee of two or three leading American astronomers. The committee, he suggests, might include persons of different political opinions. One member might be Dr Harlow Shapley, director of the Harvard College Observatory, "or others who have in the past succeeded in influencing Russian public opinion," Dr Struve says.

Because of the Soviet astronomy position, he feels that the next meeting of the International Astronomical Union should not be held in Russia, as is now scheduled.

Recognized Russian leaders in astronomy are vastly different from the officials attacking the West, emphasizes the American astronomer. Dr Struve has met and visited with delegations of them several times in the past few years and has done research since the war with Academician G. A. Shajn.

Postwar relations with Russian astronomers have been "entirely harmonious," a group who visited this country only three years ago "acted in a modest, pleasant and entirely friendly manner," Dr Struve recalls.

While the Soviets have made great official claims, Dr Struve says that he has found their astronomers personally "often too modest."

But the attackers of Western views of the universe are men who would have been called "political commissars" in earlier days, the American astronomy leader ex-

plains. Unlike genetics, where a major controversy is raging between the Soviet's party views and accepted theories, the astronomy differences are not ideologically clear-cut, Dr Struve feels. The Soviet officials uphold materialism and won't admit that there are any problems a follower of Marx and Stalin cannot solve.

"Perhaps," he suggests, "it is simply that the official Soviet mind abhors anything that is left unexplained."

Sharpest indication of the "party influence" in Soviet astronomy, Dr Struve finds, is the acceptance of the theories of Academician Otto Y. Schmidt. Mr. Schmidt is a famous Arctic explorer who has developed his ideas of such matters as the origin of the solar system.

While Mr. Schmidt has become "well known for his brave exploits in the Arctic,"

his theories of astronomy are another matter, Dr Struve emphasizes.

The American astronomer has studied Mr. Schmidt's theories in some detail, because "he was kind enough to send to me autographed copies" of some of his works. Dr Struve found Schmidt's astronomical papers "rather naive and usually completely wrong."

The Schmidt theories were disproved by Soviet astronomers at a meeting recently of the Moscow Institute of Astrophysics.

"But," notes Dr Struve, "the very fact that these distinguished men were compelled to spend their valuable time disproving the fallacies of a person (Schmidt) who had no real claim to astronomical knowledge is an indication of the way things are developing in Russia."

Even when the recognized leaders of Russian astronomy attack American astronomers and theories, they tend to do it at the beginning and end of papers, Dr Struve points out.

"It is as though they did not think in these terms when they were writing their own ideas."

"The Russian astronomers are engaged in precisely the same type of work that is done by our men of science," concludes



INDUSTRIAL BOW AND ARROW—In this method of thinning out rods of quartz to less than the diameter but several times the strength of a cobweb thread, one end of the rod is attached to a stationary base and the other to a wooden arrow. As the fiber melts under intense heat, the cross-bow is sprung shooting the wooden arrow into the air trailing the fiber with it. These thinned-out quartz strands go into a new ultra super-sensitive balance in the Technical Service Laboratories of the Socony-Vacuum Oil Company, Inc., in Brooklyn.

Dr Struve "Our methods and results are comparable and the Russians know this to be the fact"

Ideology Violates Principles

Reported attacks by the Soviets on Western astronomy are "tragically clear evidence that the policy of dictation of scientific 'principles' upon ideological and political grounds has been extended into the field of astronomy," a distinguished American astronomer declared

Dr Henry Norris Russell, famed astrophysicist of Princeton University, explained that "To call upon a colleague 'to correct his work along the lines of Soviet astronomical thought' is to violate the basic principles of scientific research

"So long as the policy is continued, those who advocate it will be separated from all believers in freedom of investigation by an impassable barrier," Dr Russell said

Science News Letter, October 8, 1949

AERONAUTICS

Better Jet Fuels Ahead

Fuels that will ignite at extremely low temperatures and which will not blow out in speeding ram-jets are being developed for rocket and jet engines.

➤ **BETTER** fuels for rocket and jet engines are promised for the near future as a result of research at the Lewis Flight Propulsion Laboratory of the National Advisory Committee for Aeronautics, Cleveland, Ohio. Equally important are engines under development capable of delivering the extremely large powers required for supersonic speeds.

All sorts of fuels and fuel combinations are being tried. Some have been found that experimentally give far better results than those now in general use. One studied is 25 times as powerful. Particularly important is the research work to develop better jet engines able to withstand the very high temperatures at which they operate, and to construct them of materials available in the United States, or at least in the Western Hemisphere. America, in national emergencies, needs independence from imports.

With the increasing use of rockets and ram-jet engines to give combat planes greatly increased power for short periods in emergencies, fuels that will ignite at the extremely low temperatures encountered at high altitudes are essential. Also essential are fuels whose flames will not blow out in the speeding ram-jet.

Rocket fuels, which at low altitudes and moderate temperatures ignite spontaneously and rapidly upon contact, may refuse to ignite at all at high altitudes, or they may ignite in explosive fashion destroying the rocket engine. Two solutions are being worked out at the Lewis Laboratory. One is to keep the engines and the fuels sufficiently warm to insure prompt and safe starting. The other is the use of added substances to the fuel to shorten the ignition lag.

The ram-jet engine, unlike the rocket, depends upon oxygen from the air for combustion. It scoops up the air as it flies at rapid speed through the atmosphere. It can operate only after it is up to a speed

of some 300 miles an hour, a speed that it can acquire from its carrier plane if it is to be used to give spurts in emergencies, or a speed that it can acquire from carrier rockets if it is launched from the ground.

Because the air in a ram-jet passes through the combustion chamber at high speed, there is a tendency for the flame to blow out. Operating the engines at high altitudes with resulting low pressures also makes combustion difficult. Since 1945, it was revealed, the velocities at which good combustion efficiencies can be maintained have been increased three-fold, and further progress is expected. Similar progress has been made in increasing the altitude limits for satisfactory combustion, a result of intensive research on flame-holding devices, fuel-injection methods, and combustion chamber design.

Present jet engines of the type used in jet fighters and bombers burn a kerosene-type fuel. When a barrel of crude oil is refined, only 6% of the resulting products is kerosene. Present plans are to use in the future about 50% of the products refined from a barrel of crude, a mixture that would contain all the kerosene and gasoline and about one-fourth of the diesel and heating oils in the petroleum. As a result of NACA's work, new jet fuels have been specified meeting this availability maximum from crude oil and they are substantially equal or better than the kerosene-type fuels now used.

Science News Letter, October 8, 1949

On This Week's Cover

➤ **ROTOR** blades on a massive shaft are capable of handling 2,000,000 cubic feet of air per minute in the compressor of the world's largest faster-than-sound new wind tunnel at the NACA's Lewis Flight Propulsion Laboratory, Cleveland, Ohio. As shown on the cover, two halves of the stator housing have been opened.

Science News Letter, October 8, 1949

ENGINEERING

Coal-Fired Locomotives Predicted to Equal Diesels

➤ **COAL-FIRED** locomotives, which will equal or better the present diesel locomotives in operation, were predicted at the meeting of the American Society of Mechanical Engineers by John J. Kane of the Standard Steam Company, Inc., at Erie, Pa.

Three research and development programs are now under way to bring about the coal-fired locomotive, he said. Only two basic locomotive designs are being considered, however. They are the gas turbine and the steam turbine, both combined with an electric drive.

In one research project, coal would be used to produce gas, which in turn is burned for the turbine energy supply. In another, the coal is pulverized and burned under pressure in new, radical combustors with direct air supply to furnish energy for the gas turbine. In the steam-turbine program, the use of water tube boilers, pressure furnace and complete combustion control are features involved in present designs.

Dwindling oil reserves are spurring the development of these coal-fired locomotives. The proposed steam turbo electric will use approximately 6,500 pounds of coal per hour at the maximum operating condition. Both gas turbine proposed units will demand between 4,000 and 4,500 pounds per hour at their highest operating rates.

These low fuel rates combined with coal conditioning, pulverization, evenness of supply and feed, and the pressurized system of combustion, set forth new and challenging demands on the coal handling system, he continued. He described coal screw conveyors and stokers developed for the purpose.

Science News Letter, October 8, 1949

AERONAUTICS

Supersonic Speed Claimed For British Jet Fighter

➤ A **BRITISH** jet fighter, still on the "secret list" but claimed to be capable of reaching a speed faster than sound, is no longer a secret as far as its general appearances are concerned. The public had an outside view of it at the recent Farnborough Airfield show of the Society of British Aircraft Constructors in London.

It is the bullet-shaped Vickers Supermarine 510. The Royal Air Force, it is revealed, will be equipped with this plane in the relatively near future. It is a descendant of the Attacker, a plane powered by a Rolls Royce Nene turbojet. The Nene develops 5,000 pounds of static thrust. Prominent features of the new Supermarine are its bullet shape and its swept-back wings.

Science News Letter, October 8, 1949

MEDICINE

Fingerprinters Poisoned

Mercury powder used in developing fingerprints by policemen was found to be a poison hazard when men were exposed to it 250 hours per year.

► THE fingerprint men in police departments are in danger of getting mercury poisoning from the dusting powder they use.

Discovery of this danger, which may be widespread in England and in the United States where the same mercury-chalk powder is used, was made when an outbreak of mercury poisoning occurred in the Lancashire Constabulary.

The cases, believed the first of this new occupational poisoning to be recognized, are reported by Dr. John N. Agate and Monamy Bucknell of the Medical Research Council, the London Hospital, in the *LANCET* (Sept. 10).

The Lancashire Constabulary consists of a detective chief inspector and some 32 detective sergeants and constables who specialize in taking and developing fingerprints at the scenes of crimes with mercury-with-chalk powder.

With the exception of one man, all vol-

unteered to be examined. Of the 32, seven had symptoms of tremor which affected the hands in each case. Three of these also had tremors of the lips and tongue and three of the eyelids. Two other symptoms known to be caused by mercury poisoning were also present: loosening of the teeth and irritability and embarrassment which caused the men to blush easily.

Although their urine was examined for traces of mercury, this was not a good test for determining mercury poisoning, the scientists pointed out. However, they said that the amount of mercury excreted by the men was abnormally high.

Estimates were made of how many hours were devoted by the men to developing the latent fingerprints. The technique used is to apply the mercury powder with a soft brush and then to blow off or brush off the excess. One of the affected patients had been exposed for only 160 hours for one year while the others varied between 250

and 460 hours per year. The scientists conclude that 250 hours per year constitute a danger.

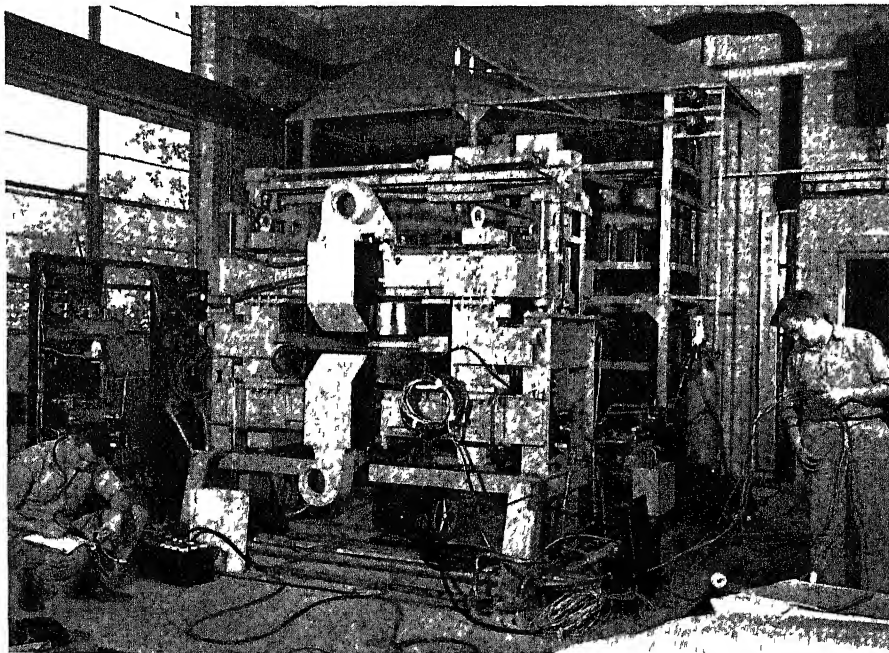
The mercury was believed to have been either inhaled by the policemen while they were dusting the fingerprints or from the mercury dust lying around the laboratory where they worked, or it could have been absorbed through the skin. Some may have acquired the mercury by putting their hands to their mouth with the mercury dust on them.

Measures for protection, such as rubber gloves or masks, do not seem adequate to these scientists. They suggest that a substitute powder be found which will accomplish the same thing.

This was actually done in the Lancashire Constabulary by the officer in charge. When the origin of the trouble among his men was found he experimented and discovered a substitute which is credited as being an improvement over mercury powder and forbade the use of the mercury compound.

Policemen who do fingerprinting as a part-time duty are not in much danger of being poisoned, the scientists stated. At the same time they pointed out that certain people may have a special sensitivity to mercury and the hazard for these would be real.

Science News Letter, October 8, 1949



80,000,000 ELECTRON-VOLT SYNCHROTRON—The first application planned for the new Iowa State synchrotron, which is shown here in the final stages of wiring, is the study of nuclear reactions produced by the high-energy X-rays of the machine. Since the energy attained by this atom-smasher is above that obtained from natural radioactive sources, it is expected to extend knowledge in this field. The machine was built by General Electric Co., and is housed in the Iowa State College Institute for Atomic Research.

ASTRONOMY

Year's Fifth Comet Visible Through Telescope

► THE year's fifth comet discovered in Russia will approach closest to the earth on Oct. 22, 1950, but it will not be a conspicuous sight that you can see in the sky.

Dr. Allan D. Maxwell, professor of astronomy of Howard University in Washington, has computed an orbit based on observations from Russia and the U. S. Naval Observatory. Just now, the comet, visible only through a fair-sized telescope, is about 345,000,000 miles from the earth and 437,000,000 miles from the sun.

Next year, on its closest approach, it will be 90,000,000 miles from the earth and 182,000,000 miles from the sun. It is coming in toward the sun and the earth very slowly and traveling southward. It is probably traveling in a parabolic orbit.

The whole of its travel through the solar system is beyond the earth's orbit and it is tilted 34 degrees to the plane of the earth's travel.

Science News Letter, October 8, 1949

Of the nation's 624,000,000 acres of forest land, 196,000,000 acres are in public ownership and the rest in private ownership.

Radioactive materials, injected into the trunk, branches or roots of trees, offer a new and rapid means of studying tree nutrition.

NUCLEAR PHYSICS

Russia's Atomic Explosion May Have Been Accidental

➤ IF THAT atomic explosion in Russia was accidental, it might have happened from a wrong estimate of the critical mass of uranium or plutonium, the amount of these fissionable metals that must be brought together to produce an explosion.

Scientists discussing this possibility, without revealing any USA secrets, however, observed that when the bomb metal is in water, actually less of it is needed to reach the state of an explosion than when it is a metallic hunk. This is because the water slows down, or "moderates," the neutrons that act as triggers to set off the material explosively. Slow neutrons are necessary to cause the fission.

The possibility is that the Russians working with the fissionable material overlooked this danger, even if it is no secret from them.

The famous Smyth report hints that the critical mass of the atomic bomb is between one and 100 kilograms or about two and 220 pounds, which are very wide limits.

Science News Letter, October 8, 1949

PSYCHOLOGY

Don't Believe Rumors Of A-Bomb Explosions

➤ DON'T believe stories you may hear about bombs dropping in your vicinity even if you hear a loud noise. This is the warning of psychologists who have studied the psychology of rumor.

The announcement of the Soviet atomic explosion has filled many with vague fears. But these will not lead to panic unless something happens nearby to crystallize them. Such a happening might be some ordinary accidental explosion with loud noise and perhaps flames. With the vague fear held in mind, people might immediately jump to the conclusion that they were being bombed. Rumors might start. Panic could follow.

Science News Letter, October 8, 1949

ENGINEERING

Drops from Spray Nozzle Sorted, Counted by Device

➤ THE thousands of liquid drops shot out of the nozzle of a spray drying machine can be sorted and counted rapidly and accurately by a new electronic device developed at the University of Wisconsin, the National Electronics Conference was told in Chicago.

The device is called a Pulse Length Sorter and Counter by the men who invented it, Prof. R. J. Parent of the institution's college of engineering, and Robert W. Schumann, a graduate student. It is of important practical use in a wide variety of

chemical and engineering industries ranging all the way from manufacturing soap powder to building gasoline engines, they stated.

Soap powders for laundry use are made by a spray-drying process, they said. Liquid soap is shot through a nozzle at the top of a tower and the drops dry into spheres as they fall. The new device enables the operator to adjust the nozzle to obtain a uniform soap powder product. In an internal combustion engine, the uniformity of the spray of the fuel injected determines the efficiency and economy of the motor's operation. The new electronic sorter-counter can be used in measuring and gaining the uniformity needed. Working details of the electronic instrument were presented to the meeting.

Science News Letter, October 8, 1949

MINERALOGY

Old Oil Wells May Yield 14 Billion Barrels

➤ SALVAGING old oil wells may triple total yields in some cases, a petroleum expert declared in Golden, Colo. One of his colleagues estimated that oil from this secondary source might amount to 14,000,000,000 barrels.

By flooding old wells with water under pressure, R. C. Earls, Tulsa petroleum consultant, said that yields may range "all the way from 25% to 300% of the primary recovery."

These are the extremes and "additional data are needed before a fair estimate can be made," he explained to the petroleum production conference being held in connection with the seventy-fifth anniversary of the Colorado School of Mines.

The 14,000,000,000 barrel estimate of oil from such secondary techniques was made by Paul D. Torrey, president of Lynes, Inc. of Houston. Current estimates of U. S. A. "secondary oil reserves" are 7,000,000,000 barrels or more, he said, adding that he is "willing to venture the guess that the physically recoverable secondary oil reserve of the nation may be as much as twice this figure."

Although this represents a relatively small proportion of the total reserve, secondary operations "nevertheless are an important factor in the business of oil production in several states," he said.

Other salvage methods in addition to water flooding, are vacuum pressure, air and gas injection, and to a limited extent open mining. Application of all of them, Mr. Torrey said, constitutes "a true conservation measure," not only in the older oil fields, but in the new fields as well because it prevents the waste of leaving hard-to-reach oil in the ground.

Foreign countries also have such secondary reserves, but so far "no systematic effort has been made to evaluate" them, he said.

Science News Letter, October 8, 1949



ENTOMOLOGY ARCHITECTURE

Termites Just Love Modern Architecture

➤ ALTHOUGH the architects don't always see eye to eye on the subject, modern architecture is enthusiastically endorsed by termites.

Two features in particular which termites deeply appreciate are building close to the ground and the use of soil-filled masonry porches. These characteristic features of modern dwellings are well adapted to the termite scheme of things. They both help the insects to gain access to the toothsome woody parts of a house on which they thrive.

These and many more helpful facts are assembled in a pamphlet on the CONTROL OF TERMITES IN BUILDINGS which has just been published by the Connecticut Agricultural Experiment Station, New Haven, Conn. It is not always an easy matter to tell whether a building has been infested by the pests, according to entomologist Neely Turner, the author. Sometimes the termites will flaunt their successful invasion by flying around the house in swarms. More often they lurk invisibly in the woodwork, and can only be detected by poking in the right places with a sharp instrument that exposes the termite burrows.

Science News Letter, October 8, 1949

GENETICS

Giant Apples Sought for Data on Genetic Make-Up

➤ AN outdoor sport that any number can play has been introduced in Geneva, N. Y. It is not called "The Big Apple", although it should be, because that is the object of the game: finding big apples.

It's easy as pie—apple pie. You don't have to be an athlete. All you have to do is to keep your eye peeled and every time you see a giant-sized apple carefully mark the tree and send off a postcard (not the apple) describing the fruit and giving the name and address of the grower.

The man who wants this information on giant apples, or sports, as they are called, is Dr. John Einset of the New York State Agricultural Experiment Station in Geneva. These unusually large fruits are studied for their uncommon genetic make-up.

Giant apples can be identified from these clues: the fruits are frequently twice normal size, flatter, and irregular. The tree on which they grow tends to be flatter and bushier.

Science News Letter, October 8, 1949

THE FIELDS

VETERINARY MEDICINE

Animals Can Have Man's "High-Life" Diseases

➤ GOUT can invade the barnyard and cirrhosis of the liver strike the family's pet dog, the American Veterinary Medical Association in Chicago warns.

Chickens, turkeys and dogs may get these diseases even though they are teetotalers and do not indulge in the high living popularly considered a cause of gout and cirrhosis, the association points out.

Cancer, stomach ulcers, kidney trouble, rheumatic fever, tetanus (lockjaw), gall stones, heart disease, goiter, diabetes, rickets and nervous disorders are other diseases common to both man and his pet and domestic animals.

Some 90 different germ-caused diseases can be spread from these animals to man, who in turn occasionally gives his infectious diseases to his animals. Example of this, the association says, is the "step" sore throat of humans which can cause mastitis in cattle.

Because of the dual nature of these diseases, medical and veterinary medical authorities and researchers are cooperating on an increasing scale to help solve common problems in both fields.

Science News Letter, October 8, 1949

ENGINEERING

New Aluminum Welding Process Speeds Operation

➤ A GREATLY improved process for welding aluminum was revealed by Battelle Memorial Institute of Columbus, Ohio. It utilizes a new pistol-shaped welding tool, through which filler metal in wire form is fed at controllable rates of speed, while the welding electric current is carried through the filler wire, forming an arc between its end and the work.

A sheath of argon or helium gas surrounds the arc and prevents air from coming into contact with the molten metal. Power may be supplied from a standard welding generator. The equipment includes both semi-automatic gun and full automatic equipment.

The process and equipment are the result of joint research conducted at this well-known industrial research center and in laboratories of the Air Reduction Sales Company at Murray Hill, N. J. This company manufactures oxygen, acetylene, inert gases and various types of welding equipment.

Aluminum plates one-eighth to three inches or more in thickness can be welded with the new process, which is to be known

as "Aircomatic." The operation is claimed to be at least four times faster than any previously known process of welding aluminum which produces welds of equal quality. It requires less skill. No solid fluxes are required. There are no slags to be cleaned from welded joints, and the welder's work is not interrupted to change electrodes. Welds can be made in any position—flat, horizontal, vertical, or overhead.

Science News Letter, October 8, 1949

PLANT PATHOLOGY

Diseased Corn Suddenly Increases

➤ A SUDDEN increase of a hitherto minor corn disease for which no cure is now known has been observed by Dr. G. W. Boewe of the Illinois Natural History Survey, Urbana, Ill.

The disease, which causes the corn stalk to rot and collapse, was first found in Arkansas in 1920. It has been known in southern Illinois since 1922, but its appearance has always been local and sporadic. This season observers reporting to Dr. Boewe note a sudden trend northward.

Bacterial stalk rot, as it is called, has in no known cases attacked more than four percent of the stalks in a given field. In the U. S. Department of Agriculture's Plant Disease Reporter, Dr. Boewe summed up the situation in these words:

"No control measures are known. At present the disease is not sufficiently abundant in most places to require control. However, the fact that it has suddenly appeared in greater than usual amounts over a much larger part of the State suggests that it ought to be watched carefully. We shall appreciate receiving additional reports and samples."

Science News Letter, October 8, 1949

PHYSIOLOGY

Knee Jerk Reflex Depends On Height to Age of 20

➤ HOW fast your foot jerks forward when the doctor strikes your knee to test your knee jerk reflex is directly proportional to your height if you are between six and 20 years old. After the twentieth year, the reflex time is longer in proportion to height than it is for the immediately younger years.

These findings, and a formula for predicting the knee jerk reflex time from body height without regard to age, were reported by Dr. G. Clinton Knowlton and Louis P. Bitt of Emory University School of Medicine at the meeting of the American Physiological Society in Augusta, Ga.

The results, they said, suggest that after age six the big feeling and moving nerve axones grow only in length and do not get any larger in diameter.

Science News Letter, October 8, 1949

ENGINEERING

English Reveal New Type of Wind Tunnel

➤ SOMETHING new in wind tunnels for aviation research has been revealed. It is a "straight-through" tunnel, powered with a standard turbo-jet engine widely used in airplanes. It is a development of the English Electric Company, London.

The engine is installed at the terminal end of the tunnel, and acts as an air ejector. The working air current in the test section of the tunnel is due to the suction of the ejector. Most wind tunnels employ the "closed-circuit" principle in which air is forced around and around the endless tunnel by means of powerful compressors. This new tunnel is straight. The air is not reused. It is sucked into the forward end and discharged into the atmosphere at the rear.

The engine employed is a Rolls-Royce Nene, which has a static thrust of 5,000 pounds. The Nene is housed in a nacelle carried in a bulge of the tunnel. A space is left between the inner nacelle and the outer wall through which two-thirds of the tunnel air is drawn by the ejector action of the jet. The remaining one-third of the air is drawn direct into the engine. When no model is in the working section, a rate of airflow nine-tenths the speed of sound can be obtained. The English Electric Company is now working on a wind tunnel to give much greater speeds, using no more power than that available from a Nene turbo-jet engine.

Science News Letter, October 8, 1949

VETERINARY MEDICINE

No More Puny Pigs—Cause and Cure Found

➤ THE cause and the cure of a mysterious ailment that produces puny pigs has just been announced. The cause has eluded veterinarians for years.

The illness has doomed thousands of pigs each year to fail to achieve adult stature, an expensive loss to farmers. It produces an inflammation of the digestive tract, the animals fail to gain weight and consequently are a total loss as porkers.

The condition arises, the American Veterinary Medical Association reports, from a protein and vitamin deficiency in the diet. Piglets fed a low-protein diet lacking essential B vitamins develop the inflammation, a form of swine enteritis, and suffer from scours, a form of diarrhea.

A high-protein diet alone does not cure the condition. When in addition B vitamins are injected, the animals promptly respond. They get back their appetite, put on weight, and are well on the way to market. The vitamins used are niacin, calcium pantothenate, and in some cases, riboflavin.

Science News Letter, October 8, 1949

ENGINEERING

Cut Heat Loss to Save Fuel

Full heat value from fuels requires stopping up all avenues through which heat can escape and proper firing of stoves for full combustion of coal.

By A. C. MONAHAN

➤ THE careful home-owner already has his heating furnace in shape for its winter job, but now is the time to examine the house itself and to put it into condition for heating economically and efficiently. Lost heat means fuel wastage.

Preparation for economical heating means closing cracks and crevices through which heat may escape, the installation of window and door stripping, re-puttying and painting storm windows, and perhaps the installation of wall and roof insulation if past experience shows that it is needed.

The furnace itself is the number one factor in satisfactory heating, but a good furnace is of slight economical value if the building itself will not hold heat. Every furnace needs careful preparation before the winter fire is ignited. The coal-burner particularly needs attention. Usually it is a job for the home-owner, unless new parts must be installed. For the oil or gas furnace, an expert is desirable. The cost is usually far off-set by fuel saving.

Removing Soot

The principal job with the coal burner is proper cleaning. All soot must be removed from the flues. Carbon deposits are excellent insulators, and soot layers on the flues prevent the passage of the heat from the fire to the air or water which carries the heat to the rooms. A heavy soot deposit can cut heating efficiency by one-half.

Ordinarily the soot is removed with a wire brush with flexible handle which is standard equipment with most coal furnaces. Muscle and persistence are the principal requirements. Summer cleaning is not enough; flues of a furnace in use should be cleaned perhaps once a month, the frequency depending upon the type of coal used and the skill of the fireman as an operator.

Beside cleaning, there are other factors in furnace preparation that are important. Warped grates are nuisances, and they are also coal-wasters. They should be replaced. All dampers and checks, and safety valves, should be checked and replaced if necessary. Stovepipe from furnace to chimney should be renewed if it shows signs of leakage. This is essential to eliminate fire hazard and to prevent the escape of carbon monoxide and other gases into the house, and also of smoke which soon settles as soot on the walls.

For fuel saving, proper furnace firing is all-important. Most home-owners are not experts. What they have learned is by trial and error. No matter how efficient they may think they are, they should study with care available publications on furnace firing that have been prepared by professionals.

Such publications are available without cost from the U. S. Department of the Interior and the Department of Agriculture. They also can be obtained from many state universities which have given special study to home heating problems. The University of Illinois, at Urbana, might be mentioned as one.

Again, excellent firing directions are available from Anthracite Institute, Wilkes-Barre, Pa., and Bituminous Coal Institute, Washington, D. C. These are national organizations maintained by the anthracite and bituminous industries respectively, and both are interested in the wider use of coal through better coal usage.

A belching chimney is always a sign of waste. Smoke is soot, and soot is made up of fine carbon particles which escape combustion in the furnace. Smoke from a chimney means that complete combustion is not taking place. It is undesirable from another standpoint that of health. The soot in the atmosphere, together with gases, also partly the results of incomplete combustion, add pollution to the air. It should not be assumed that the furnace is the only air-polluter. Much pollution comes from other sources.

Improper Firing

A belching chimney is also a sign of improper firing. Because of its nature, bituminous coal creates more smoke than anthracite. Spreading the fresh coal over the entire burning coal bed results in much smoke. Better firemen heap the bituminous coal in the ordinary furnace either on one side or in a cone in the center so that combustion takes place at the foot of the slope.

There is an air-jet system of eliminating smoke in a commercial coal furnace but it has not yet been adapted for use in the household. The principle involves a stream of air driven into the combustion chamber over the coal. There the air mixes with the gases and vapors formed by the heat of the burning coal, and causes complete combustion.

Some of the stove and furnace patents on file in the U. S. Patent Office indicate that inventors have been trying for nearly 100

years to develop practicable smokeless coal heaters, it was recently stated by Prof. J. R. Fellows of the University of Illinois. Success was limited. But the university engineering experiment station seems now to have the problem well solved.

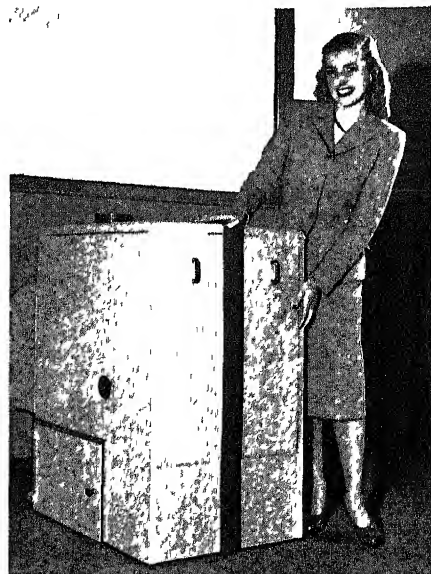
A smokeless stove, already on sale, has been developed by Battelle Memorial Institute of Columbus, Ohio. The development project, which had the same objective as that of the University of Illinois, is under the sponsorship of Bituminous Coal Research, Inc., and a group of stove manufacturers.

Smokeless Heater

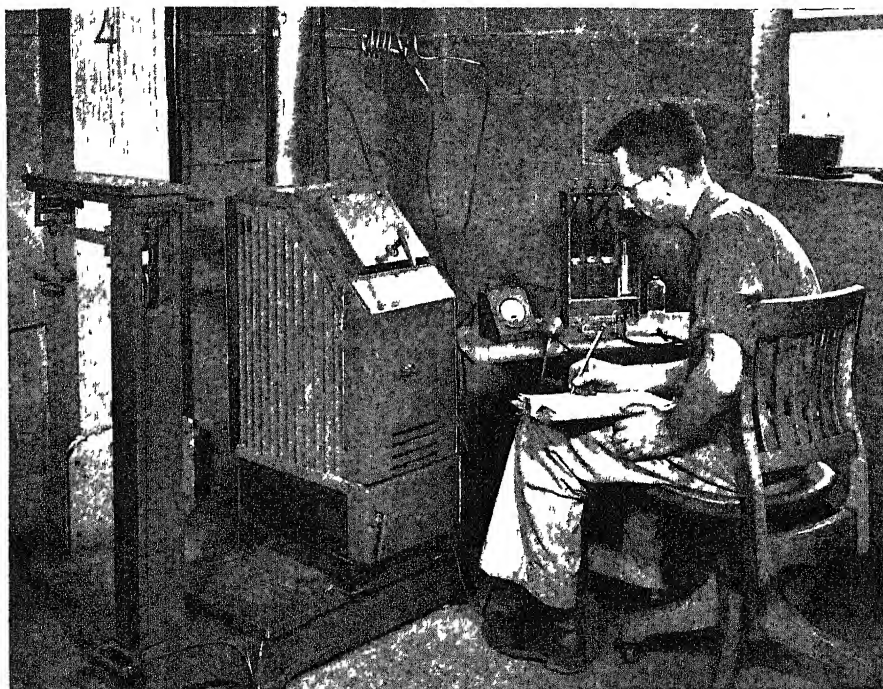
In the Illinois furnace, fresh coal is converted to coke in a coking chamber at the front of the furnace, then is fed into a coke-burning combustion chamber at the rear. The volatile matter released as a gas in the coking process mixes with secondary air introduced through vertical air passages adjacent to the combustion flue, where the mixture becomes ignited.

The rate of release of gases from the fresh coal is governed by the amount of air admitted to the coking chamber, and the rate at which the coke is burned is determined by the amount of air passing in the ashpit door and through the grates.

Not all effort to develop better coal burning furnaces is confined to bituminous burners. A new anthracite furnace, now on the market, is claimed to be efficient, soot-



ANTHRACITE ANTHRATUBE—Bearing little resemblance to ordinary furnaces, the Anthratube is claimed to be efficient, sootless and smokeless.



SMOKELESS HEATER—One of the recent developments in home-heating is this smokeless heater under test in the Champion Coal Company's laboratory at Pittsburgh.

less and smokeless

In basic principle, it was developed by the Anthracite Institute, Wilkes-Barre, Pa., but the creation of practical household units was carried out by commercial furnace manufacturers. It is known as the Anthratube. One claim is that it saves from 15% to 38% of the fuel bill. Anthra-Flo is the newest development in equipment, and utilizes the general principles behind the Anthratube.

The Anthratube bears little resemblance to ordinary furnaces, being relatively small in size, and having a horizontal tubular combustion chamber from six to eight inches in diameter. Coal, from a chute, is forced in one end in a continual stream by a screw propeller, similar to that in the familiar household meat grinder. The same pressure forces the ashes out the other end.

Combustion takes place in the half of the tube nearest the ash end. The coal is preheated in the approaching stretch. Air for combustion is drawn through the tube in the opposite direction to the movement of the coal. The same suction draws the gases of combustion through the unignited fuel in the tube and out into the chimney. The heat from the combustion is picked up by air or water in a chamber surrounding the combustion tube.

Coal is still by far the most important fuel used in America in spite of greatly increased installation of oil and gas furnaces. It will probably always remain the most widely used home fuel because there is enough unmined coal in the country to last for many centuries, while known deposits of natural petroleum and gas are approaching exhaustion.

But wood promises to become more important. Much wood now wasted in logging operations may find its way into the fuel market in the present campaign to save wood wastage.

Foreseeing wide use of wood as fuel, the Northeastern Wood Utilization Council, New Haven, Conn., has had a furnace developed to deliver more useful heat from the wood. The new furnace is called the Woodomat, and it is now in commercial production. In it the wood is first heated enough to break it down into charcoal and gases. These products are then mixed with additional air and burned. Complete combustion is the result, and there are no deposits of creosote and soot.

Science News Letter, October 8, 1949

PSYCHIAIKY

Alcohol Addiction Comes From Five Sources

► FIVE things combine to make an alcohol addict, Dr. Robert V. Seliger, Baltimore, Md., psychiatrist, told the American Prison Association's Congress of Correction in Milwaukee, Wis.

The five are 1 Ancestry 2 Early and later emotional hurts, likes and experiences, both conscious and unconscious 3 A physical ingredient including the alcoholic's neurological system and the reactions associated with his glandular make-up, blood chemistry content, biological rhythm and metabolism 4 Emotional and personality difficulties with other people and in coping with situations 5 A lack of or inadequate basic philosophy, faith and conviction in the essential and profound worthwhileness of life.

Science News Letter, October 8, 1949

MATHEMATICS AGRICULTURE

Slippery Statistics Studied in Paris


► IN an attempt to remove some of the slipperiness from the elusive science of statistics, European governmental experts are going to a three-month "school" in Paris sponsored by the Food and Agriculture Organization.

The "students" are government statisticians. The objective is to bring all agriculture and population statistics into uniformity, so that the figures from one government may be readily compared to those of all others.

This venture, which will run until Dec. 22, is called the European Center of Applied Agricultural and Demographic Statistics. A successor to previous statistics seminars held by FAO in Baghdad and Mexico, the Paris center was organized with the help of the United Nations Statistical Office and the French Government, and with the cooperation of UNESCO.

Science News Letter, October 8, 1949

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GENERAL SCIENCE

Science Talent Sought

The Annual Science Talent Search goes into its ninth year of discovering and fostering through scholarships the science ability of the Nation's young people.

► HIGH school students with scientific research ability are now being sought in the Ninth Annual Science Talent Search.

Boys and girls, seniors in the 27,000 private, parochial and public schools in continental USA are now eligible for \$11,000 in Westinghouse Science Scholarships to further their education in science.

In announcing the Science Talent Search for the ninth consecutive year, Watson Davis, director of Science Service, which conducts the Search through Science Clubs of America, reaffirmed the need for finding and saving the science talent of young people. "One of the most precious resources of our country," he said, "is the talent of its boys and girls. Talent in science is a rare gift. It must be recognized and cultivated wherever it can be found."

Past experience has proved that students with science talent are not restricted to certain parts of the country. They are everywhere. All high school principals will

soon receive the forms to request entry materials in the Ninth Annual Science Talent Search for their most promising science-minded seniors.

About 16,000 sets of entry materials are expected to be sent out on and after Nov. 15. The thousands of seniors will comply with all requirements for entry right in their own schools.

From the 16,000 entries it is estimated about 3,500 will complete all entry requirements. Of these 40 will be named as winners and will receive 5-day, all-expenses-paid trips to Washington, D. C., to attend the Annual Science Talent Institute.

Another 260 will be named for honorable mention. All 300 will be recommended to colleges, universities and technical schools of their own choice. As in the past, it is expected many will receive offers of financial assistance for college education from other sources on the basis of this honor.

To comply with entry rules, each contestant must take a three-hour science aptitude examination in his own school, submit personal and scholastic records and write an essay of about 1,000 words on "My Scientific Project." The examination may be taken as early as Dec. 5 but all entries must be in the offices of Science Clubs of America by midnight, Tuesday, Dec. 27, when the competition closes.

Winners and honorable mentions will be announced late in January, 1950, and the 40 winners will come to Washington, D. C., in March, 1950. After five days of meeting the nation's outstanding scientists, learning about the latest developments in science, and visiting places of historic and scientific interest, the winners will receive scholarships ranging in size from \$100 to \$2,800.

Through the eight years of its existence the Annual Science Talent Search has located 320 winners and 2,080 honorable mentions. These young people are now making their mark in scientific circles. Many of them already have from one to four degrees in science and are active as chemists, physicists, doctors, mathematicians, engineers, biologists, astronomers and in many other fields of science. Some have made important contributions to their fields of study and others are well along in their preparation to do so.

The objectives of the Science Talent Search are:

1. To discover and foster the education of boys and girls whose scientific skill, talent and ability indicate potential creative

originality and warrant scholarships for their development.

2. To focus the attention of large numbers of scientifically gifted youths on the need for perfecting scientific and research skill and knowledge so that they can increase their capacities for contributing to the rehabilitation of a war-dislocated world and to help the United States, with the aid of science, to lead the world to permanent peace.

3. To help make the American public aware of the varied and vital role science plays in world affairs and in raising the standard of living.

The judges of the Science Talent Search are Dr. Hailow Shapley, director of the Harvard College Observatory and president of Science Service, Dr. Rex E. Burton, Washington psychiatrist, Dr. Harold A. Edgerton, vice-president of Richardson, Bellows, Henry & Co.; and Dr. Stewart H. Britt, manager of Research and Merchandising, McCann-Erickson, Inc., both of New York City. The latter two have designed the science aptitude examination for each of the Science Talent Searches. High school seniors in some states will have a double chance to win scholarships through state Science Talent Searches run concurrently with the national competition and by special arrangement with Science Clubs of America.

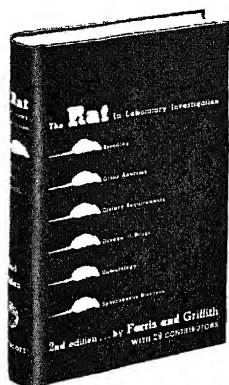
In 1949 the following states held these competitions: Alabama, District of Columbia, Georgia, Illinois, Indiana, Iowa, Louisiana, Michigan, Minnesota, Montana, Pennsylvania, Tennessee, Virginia, West Virginia and Wisconsin. Other states also signed up for 1950 include: all of New England, South Dakota and Texas.

The Science Talent Search is conducted annually by Science Clubs of America, administered by Science Service. It is made financially possible by the Westinghouse Educational Foundation of the Westinghouse Electric Corporation.

For complete details of the Science Talent Search write to Science Clubs of America, 1719 N. St., N. W., Washington 6, D. C.

Science News Letter, October 8, 1949

NEW 2nd EDITION
on current advances



The Rat in Laboratory Investigation

edited by
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and
John Q. Griffith, Jr., M.D.
With 29 Contributors

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Words In Science— APE-MONKEY

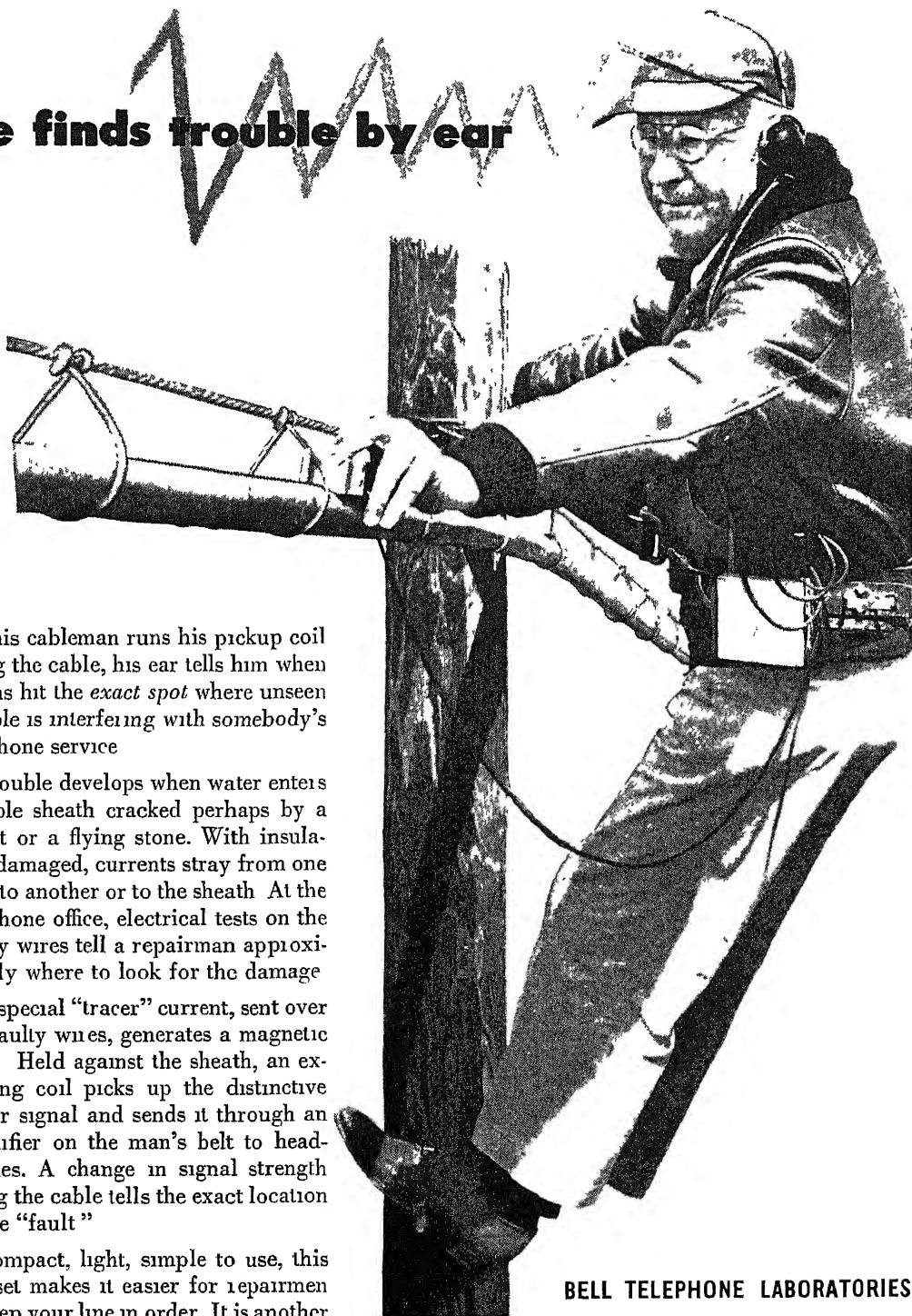
► The apes are the most man-like of all animals. They walk on two legs, but have long arms and differ from men in having big toes which oppose the other toes in the way a thumb opposes the fingers.

Monkeys differ from apes in more than their smaller size. They have tails and some have cheek pouches. They ordinarily walk on four feet although they sit erect.

Both monkeys and apes along with lemurs and tarsus belong to the general order of primates.

Science News Letter, October 8, 1949

He finds trouble by ear



As this cableman runs his pickup coil along the cable, his ear tells him when he has hit the *exact spot* where unseen trouble is interfering with somebody's telephone service

Trouble develops when water enters a cable sheath cracked perhaps by a bullet or a flying stone. With insulation damaged, currents stray from one wire to another or to the sheath. At the telephone office, electrical tests on the faulty wires tell a repairman approximately where to look for the damage

A special "tracer" current, sent over the faulty wires, generates a magnetic field. Held against the sheath, an exploring coil picks up the distinctive tracer signal and sends it through an amplifier on the man's belt to headphones. A change in signal strength along the cable tells the exact location of the "fault"

Compact, light, simple to use, this test set makes it easier for repairmen to keep your line in order. It is another example of how Bell Laboratories research helps make Bell Telephone service the most dependable in the world

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BIOLOGY

NATURE RAMBLINGS

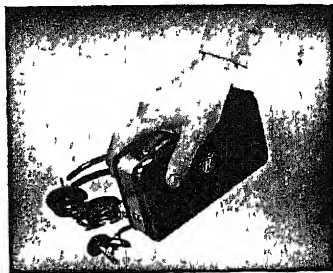
by Frank Thone



Defeating Winter

➤ LIVING things use a wide variety of means in defeating or evading the deadly blight of winter! Plants, in general, have the hardest time of it. Lower forms, being mostly aquatic, keep refuge in the water, as fish do, and stolidly stick it out. Water seldom freezes all the way to the bottom. Some of these pond inhabitants, at that, produce desistant spores in autumn, that fall to the bottom and lie dormant until spring.

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Higher plants either trust the fate of coming generations to their seed and submit to being frozen to death, as the annual herbs do, or crouch beneath coverings of dead leaves and drifted snow, or even retreat into bulbs, rootstocks, etc., leaving no parts exposed above the surface. Trees, shrubs and woody vines either shed their leaves and stand as skeletons through the bitter season, or cling stubbornly to close-reefed evergreen foliage, and wrestle it out with the storms.

Animals, being motile for the most part, have a wider choice. Some, like short-lived insects, entrust the fate of the species to eggs or pupae, as annual plants do to seeds, and make no attempt to live through the winter. Others, notably birds, frankly run away, migrating southward in vast flocks as winter moves down the map, to return north with spring.

Many hibernate, and there are all degrees of hibernation. Some, like ground squirrels

and frogs, pass into a "deathseeming swoon," from which it is extremely difficult to arouse them without warming them up to springtime temperature. Others, like bears and some species of squirrels, sleep deeply or lightly, as particular environmental conditions dictate. Some bears go into their dens in autumn and are not seen again until spring. Others emerge during thaws and forage for a little extra food to supplement their stored fat. In the South, of course, bears do not hibernate at all.

Many animals, like hawks and owls, chickadees and nuthatches, the fox, wolf and weasel tribes, rabbits and quite a number of rodents, are able to find enough food to keep their life-fires going full blast all winter, especially since the majority of them are able to make or find warm shelter of some kind.

(Reprint from SNL, Oct 18, 1941)

Science News Letter, October 8, 1949

MEDICINE-CHEMISTRY

Find Fever Disease Aid

➤ CONQUEST of the hitherto incurable San Joaquin or valley fever prevalent in our southwestern desert areas was forecast by a report to the American Chemical Society meeting in Atlantic City, N. J., of a new antibiotic substance, called prodigiosin.

E. D. Botts and Arthur Lack of the Birmingham Veterans Administration Hospital, Van Nuys, Calif., reported that a dye extracted from the bacteria, *B. prodigiosus*, is effective against the organism causing this highly infectious disease, both in the living body and the test tube.

Coccidioidomycosis, as the disease is called, caused considerable trouble among troops in the Southwest for training during the war.

Plastic Starches Fabrics

A new plastic that will permanently "starch" or size fabrics and add strength to paper when wet was reported by a DuPont chemist. The new synthetic resin is what is called a polymer containing free aldehyde groups and it is similar to polyvinyl acetate in its properties.

E. F. Izard of Dupont's rayon department at Buffalo, N. Y., explained that the aldehyde-modified polyvinyl alcohol produced is soluble in water, but when films are cast from it and heated, it becomes insoluble in water. Thus ironing fabrics to which the new resin is applied makes the sizing or "starching" permanent as well as pleasing in appearance. It can also be used to anchor pigments and other substances to paper or fabrics.

"Sunlight" Flavored Milk

That pleasant "sunlight" flavor of milk is caused by the action of light on the butterfat in the milk, but it is really a mild rancidity, Dr. George R. Greenbank,

U. S. Bureau of Dairy Industry chemist, reported in accepting the \$1,000 Borden Award for his quarter-century researches on improvement of quality of powdered milk.

Flavor of Foods

Pleasantness of flavor of foods is not just a matter of sweetness or mildness or even use of flavor factors that are pleasant in themselves. E. C. Crocker of Arthur D. Little, Inc., Cambridge, Mass., told the chemists. Raw onion and garlic in a salad, rancidity or moldiness in cheese, lemon juice, vinegar, and even mustard, pepper and other spices that pain the mouth, all are pleasant flavors.

The most familiar flavor is usually the most popular, he said, telling of one experiment with beer that showed that a person is most likely to choose in an unlabeled bottle test the kind of beer that he has been using consistently for the past two weeks.

Plastic Prevents Corrosion

Plastic raincoats can now be used to protect concrete structures and both concrete and steel pipe from corrosion by acid water, Charles M. Bodach and J. F. Wilkes of Dearborn Chemical Co., Chicago, reported. The protective coating is a vinyl resin and it is saving from destruction cement-asbestos pipes and concrete water tanks that came into use during war time steel shortages.

Science News Letter, October 8, 1949

More than 1,000,000 Americans obtained their living directly from the forests, some in the woods, some in lumber and paper mills, and others in wood-working industries.

Books of the Week

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ADVANCED ORGANIC CHEMISTRY—G. W. Wheeler—Wiley, 2d ed, 799 p, illus., \$8.00 A unified treatment with emphasis on the structural theory in its broadest sense. A text for advanced students.

APPLIED MECHANICS—Harvey F. Gavin—International, 2d ed, 417 p, illus., \$5.25 A complete revision. The work is adapted to the less mature student familiar with calculus.

BOTANY AND OUR SOCIAL ECONOMY—Alexander C. Martin—National Wildlife Federation, 80 p, illus., paper, 10 cents This pamphlet points out our dependence upon the plants that nature so abundantly provides.

COLLEGE BOTANY—Harry J. Fuller and Oswald Tippo—Holt, 993 p, illus., \$5.75 An elementary college text designed for use in two-semester and three-quarter courses.

ENGINEERING MATERIALS AND PROCESSES Metals and Plastics, William Howard Clapp and Donald S. Clark—International, 526 p, illus., \$6.50 Basic information on the properties of materials and processes by which those materials are made available for use.

GENETICS IN SWEDISH FORESTRY PRACTICE—Bertil Lindquist—Chronica Botanica, 173 p, illus., paper, \$3.50. A summary of the objects, methods and initial results of forest tree-breeding work in Sweden.

HEALTH GUIDES AND GUARDS—Francis P. Wall and Louis D. Zeidberg—Prentice-Hall, 4th ed, 390 p, \$4.00. This edition includes the current theories and therapies.

HOW TO DRAW ROLLING STOCK—Paul B. Mann—Studio, 62 p, illus., \$1.00 Those who have a hobby of trains will enjoy this beautifully illustrated little book.

THE KID FROM MARS—Oscar J. Friend—Fell, 270 p, illus., \$2.50 A science fiction story dealing with the coming to Earth of one humanoid man from Mars.

LABORATORY EXPERIMENTS IN ORGANIC CHEMISTRY—Roger Adams and John R. Johnson—Macmillan, 4th ed, 525 p, illus., \$3.25 A beginning laboratory manual.

LABORATORY MANUAL AND PROBLEMS IN GENERAL CHEMISTRY—A. W. Laubengayer—Rinehart, 229 p, illus., paper, \$2.25 Emphasis has been placed on training in the general principles and experimental methods.

MAN ON THE LANDSCAPE—Vernon Gill Carter—National Wildlife Federation, 129 p, illus.,

\$1.50 Some of the fundamentals of plant conservation.

MARINE PERSPECTIVE—Michal Leszczynski—Studio, 64 p, illus., \$1.00 If you draw or like the sea you will like this book, if you don't draw, it will make you want to try.

THE NAVAJO METEORITE—Sharat Kumar Roy—Field Museum of Natural History, 11 p, illus., paper, 30 cents A monograph.

PHARMACEUTICAL COMPOUNDING AND DISPENSING—Rufus A. Lyman, Editor-in-Chief—Lippincott, 321 p, illus., \$6.50 Latest information written by 12 leading authorities.

PLANE GEOMETRY—William G. Shute, William W. Shirk, and George F. Porter—American, 406 p, illus., \$2.48 A beginning high school text.

PRINCIPLES AND PRACTICE IN ORGANIC CHEMISTRY—Howard J. Lucas and David Pressman—Wiley, 557 p, illus., \$6.00 A laboratory reference and manual for students of organic chemistry.

SCIENCE SUBJECTS MADE EASY A Guide to the 10 Basic Sciences—Henry Thomas—Double-day, 513 p, illus., \$3.95 Elementary information on the basic sciences for home instruction and guidance.

SCIENTIFIC AUTOBIOGRAPHY AND OTHER PAPERS—Max Planck—Philosophical Library, 192 p, \$3.75 The last writings of a great physicist. Translated from the German by Frank Gaynor.

UNITED STATES RELATIONS WITH CHINA—Department of State—Gov't Printing Office, 1,054 p, \$3.00 Based on the state department files during the past year. This is the "White Paper."

Science News Letter, October 8, 1949

MEDICINE

Surgery Helps Women With Over-size Breasts

► WOMEN whose breasts are too large or who have pendulous (hanging) breasts can be helped by surgical operations, Dr. Hans May, University of Pennsylvania Graduate School of Medicine, told the Medical So-

ciety of Pennsylvania meeting in Pittsburgh.

A "most satisfactory" appearance can be achieved, he said, without danger of cysts developing or the breast's normal function as a milk-producing gland being disturbed.

Of the variety of operations available for reconstruction of over-large or otherwise deformed breasts, no one is suited to every type of deformity, Dr. May pointed out. He has worked out an operation of his own which combines certain useful features of some of the standard methods.

One feature of his operation is the removal of the areolas, which are the rings surrounding the nipples, and their transplantation to new sites previously selected and marked by aniline dyes.

Science News Letter, October 8, 1949

Some 80,000,000 pounds of oyster meat are harvested each year in the United States, as a producer, Virginia ranks first with Maryland next.

In

- English ←
- French ←
- German ←
- Spanish ←

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By MAXIM NEWMARK, Ph.D.

IN the first 200 pages of this useful, practical dictionary are listed some 10,000 current English terms, each with its French, German and Spanish equivalents. The words listed are those most frequently used in the physical sciences and mathematics, and also in such applications as aeronautics, architecture, machine shop practice, meteorology, photography and radio. Each English entry is numbered and in subsequent pages there are separate indexes of the French, German and Spanish terms, correspondingly numbered, permitting two-way use of any of these languages with the English. "Finally there are several pages of conversion tables and lists of technical abbreviations for each language. This dictionary should prove to be exceedingly useful, particularly for handy reference purposes, the library of every scientific and technical department should have a copy available."—American Journal of Physics

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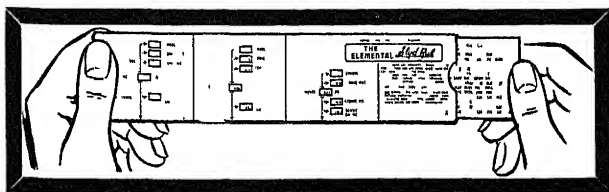
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✿ **PAINT REMOVER**, developed by the U. S. Air Force for the removal of aircraft camouflage enamels, can be applied as a spray, after which a high-pressure water wash completes the job. It is believed to be a successful material for many industrial processes.

Science News Letter, October 8, 1949

✿ **SPRAY NOZZLES**, for all kinds of spray problems where a fine break-up at low pressure is required, operate on a new principle, utilizing a unique spiral design, somewhat like the spiral of a wood-boring bit, that produces a finer atomization but is practically non-clogging.

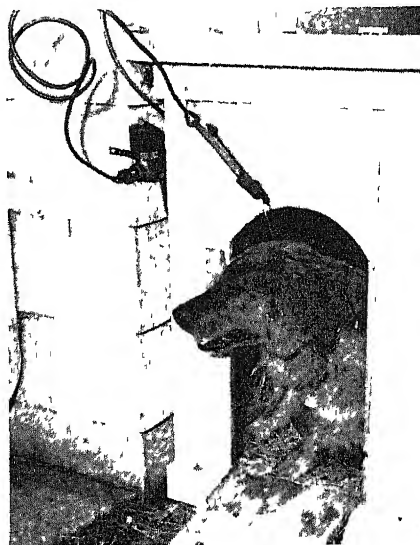
Science News Letter, October 8, 1949

✿ **FLASH-KIT** for photographers comes complete with all necessary parts, leaving for the purchaser an easy job in final assembly. It is designed to operate with any presently available camera, and includes a lamp good for many thousands of flashes.

Science News Letter, October 8, 1949

✿ **FISHMOUTH SPREADER**, an improved type recently patented and fashioned from round wire stock, is a scissors-like device but one whose jaws are spread as the handles are pressed together. Its salient feature is a trigger cross arm between the handle ends, the notched teeth of which hold the spreader in open position.

Science News Letter, October 8, 1949



✿ **BARK CONTROLLER**, for the dog with an early-morning habit of yapping for release from the doghouse, is a homemade apparatus with a microphone for an activator. The microphone picks up the "bark" and starts the mechanism that delivers a squirt of water on the dog's head, as shown in the picture.

Science News Letter, October 8, 1949

✿ **MAGNETIC CATCH** for cabinets, cupboards and all small-hinged doors, consists

of a permanent magnet, attached to the door frame on the under side of a shelf, and a small metal disk on the door. The magnet works on a simple phosphor spring.

Science News Letter, October 8, 1949

✿ **EFFECTIVE COOLER** for beer in metal kegs is cold water circulated in sealed plastic bands which are attached snugly to the kegs. The bands can be snapped off an old keg and on to a new one with little time or effort. Vinylite sheeting, of the type used, remains flexible at low temperatures.

Science News Letter, October 8, 1949

✿ **SILID BOWLS**, rectangular in shape and made of curved birchwood, are bonded together with liquid plastic and formed under high pressure. The wood is treated by an impregnation process which makes it washable and liquid proof, and prevents stains from oil, alcohol or water.

Science News Letter, October 8, 1949

✿ **ELECTRIC DEPTH** gauge, to measure the distance from the surface to water in a well, utilizes on a weight lowered in the well a coating of such character with respect to the well casing that a current is created when water is reached by the electrode on the weight. It is a newly patented device.

Science News Letter, October 8, 1949

Do You Know?

The magnitude of a star is its brightness, not its size.

Oysters are taken commercially in the water of every American seaboard state except Maine and New Hampshire.

Cattle in Turkey are raised principally as work animals, and meat and milk are of secondary importance, sheep and goats are the principal food-supplying animals.

In recent tests on 58 coals collected from eight states, it was shown that those from Washington, Alabama and Utah gave the highest ammonia yields in a coking process.

Greenland dogs, sled-pulling huskies, are going from polar to polar regions as sled animals for a Norwegian-Swedish-British Antarctic expedition which leaves Europe soon, some 30 of them are now in Norway.

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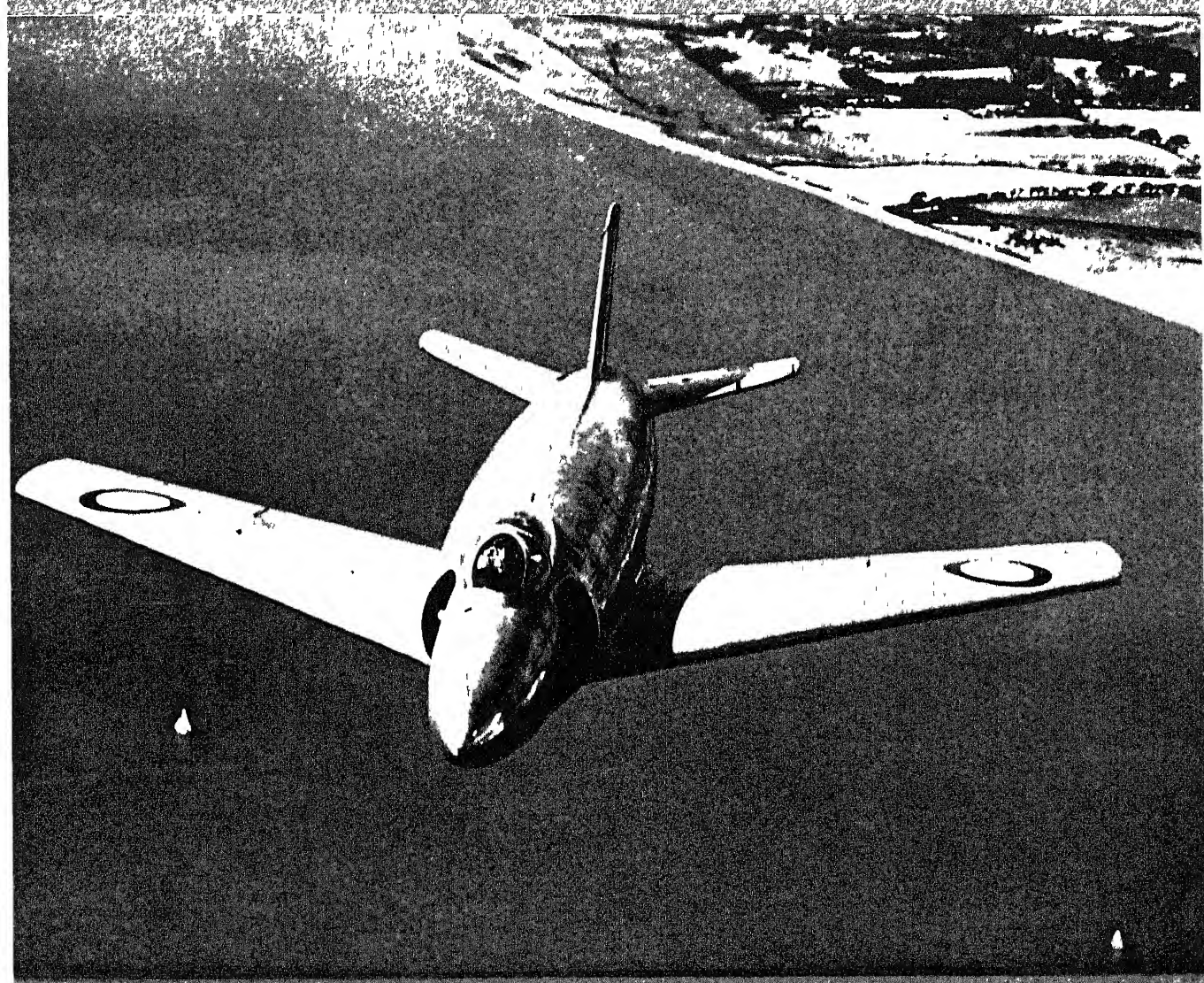
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VOL. 56 NO. 16 PAGES 241-256

MEDICINE

Mumps Mocks Chick III

➤ A BLOOD relation between mumps in humans and a serious poultry sickness, called Newcastle disease, has been discovered.

Half the patients recovering from mumps have in their blood factors which react against the virus of the poultry disease as if they had actually had this chicken sickness, Erwin Jungherr, Roy E. Luginbuhl and Lawrence Kilham, of the University of Connecticut and Harvard School of Public Health, report in the journal, *SCIENCE* (Sept. 30).

Newcastle disease has been reported spreading to human beings. So far, only five cases in humans that have been confirmed by isolation of the virus that causes it have been reported. The first two confirmed cases in the United States were discovered less than a year ago by Dr. W. L. Ingalls and Ann Mahoney of the College of Veterinary Medicine at Ohio State University.

The Connecticut and Harvard group warn that the diagnosis of Newcastle disease in humans should be made with caution, since their discovery that blood from recovering mumps patients may contain factors suggesting the person had the chicken disease.

The Ohio cases that were proved by isolating the virus occurred in a broiler plant operator and a junior veterinary student. The broiler plant operator came to the

poultry diagnostic laboratory at Ohio State University bringing several of his chickens for diagnostic purposes. While he was there, Dr. Ingalls noticed that the flock owner had a definite inflammation (conjunctivitis) of his left eye. The flock owner said he had had this for three days and that it started three days after sickness was noted among his chickens. A little of the pus in the corner of his eye was removed on a cotton swab and in this the virus of Newcastle disease was discovered.

The veterinary student apparently got his infection from chickens he was examining after they had died of the disease. Details of both these cases are reported in the *AMERICAN JOURNAL OF PUBLIC HEALTH* (June). Both patients recovered within a few days.

The eye inflammation is a typical symptom of the disease in humans. The nervous system and respiratory tract are also affected, according to a report from the American Veterinary Medical Association. Chief signs of the sickness in chickens, this association states, are a high death rate among the young chicks and a sharp reduction in laying rate among mature fowl.

The virus that causes the disease is said to resemble closely human influenza virus. A and B Vaccines are the chief means of combating the disease among poultry.

Science News Letter, October 15, 1949

PSYCHOLOGY

Test Detects Alcoholics

➤ THE alcoholic addict can be distinguished from the social drinker by a simple paper-and-pencil test, Dr. Morse P. Manson, of the Birmingham Veterans Administration Hospital, Van Nuys, Calif., reports.

From the answers given by a man or woman to 60 simple yes-no questions, a physician can tell whether to advise the person never to touch liquor or whether it is safe for him to drink in moderation.

"I drink because I am unlucky in love." This is one of the items which sets the alcoholic addict apart from non-alcoholics and the social drinker. The alcoholic can think up many more reasons for his drinking than does the social drinker.

"A drink or two is the best way to get quick energy or pep," is another in this same category.

The alcoholic is a very emotionally immature person who is often hypersensitive, Dr. Manson found. Among the items that bring out this personality trait are the following:

"Drinking puts me at ease with people."

"I drink to get over my feelings of inferiority."

"A drink or two before a conference, interview, or social affair helps me very much."

"I take a drink or two before a date."

The alcoholic addict is a steady drinker and so he is betrayed by his answers to these statements.

"I often take a drink or two in the middle of the afternoon."

"I drink about a pint or more of whisky a week."

"I get drunk about every pay day."

The alcoholic is frequently an undersocialized individual who shuns social occasions. He prefers drinking over other activities. That is why he answers no to the following questions.

"I would rather go to a dinner or banquet than drink."

"I would rather attend a lecture or concert than drink."

"I would rather go to a movie than drink."

The addict cannot stop drinking once

he gets started and so these statements point him out.

"I go on a binge at least once a month."

"I usually pass out after I start drinking."

"I often have blackouts when I am drinking."

Men alcoholics appear to be more consistent drinkers and show stronger preferences for drinking than do women addicts. Women show much less control over their drinking, think up more reasons for their drinking and display more emotional immaturity than do men.

Dr. Manson's complete report appears in the *AMERICAN JOURNAL OF PSYCHIATRY* (Sept.).

Science News Letter, October 15, 1949

ELECTRONICS

One Electron Beam Controls Another Stream

➤ A NEW kind of electron tube promising advantages in television and radio has been developed at the famous Philips Lamp Works Research Laboratories, Eindhoven, The Netherlands. In it a beam of electrons controls another ribbon of rushing electrons, which are the smallest particles of electricity.

Other devices approaching the effect of this new tube have not given very large voltage differences, while the new tube is so positive that it is expected to have commercial usefulness.

So small is an electron that if one is sent across a beam of electrons the chance is very small it will pass close enough to any other electron to influence it or deflect it from its original path.

The two Philips scientists, J. L. H. Jonker and A. J. W. M. van Overbeek, worked out a small tube with grid, screen and conducting walls that allows one beam to lower the potential in the space where the other electron beam crosses. The passage of one stream can be modified or completely stopped by the other beam.

Science News Letter, October 15, 1949

PHYSIOLOGY-ANTHROPOLOGY

Living at High Altitudes Causes Racial Variety

➤ LIVING at the high altitudes of the Andean mountains may have brought about new racial characteristics in the Indians there, Dr. Carlos Monge M., Peruvian physiologist, has suggested.

The differences in the culture and in the behavior patterns of the Indians of Peru and Ecuador might be explained by the high altitudes, Dr. Monge told the Twenty-ninth International Congress of Americanists meeting in New York. Blood and chemical indexes for humans living at sea level, at 1000 feet and at extremely high altitudes were established by Dr. Monge.

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MEDICINE

Radiation Sickness Aid

Dramamine, the air and seasickness remedy, is being used to relieve patients suffering from sickness caused by X-ray and radium treatment.

► **DISCOVERY** of a new drug to help cancer and leukemia patients undergoing X-ray or radium treatment is announced by three Mayo Clinic doctors

The drug is dramamine, the air and seasickness remedy and preventive which started out as a drug for hayfever patients

Many patients who must have X-ray or radium treatment for life-threatening, deep-seated cancers or for leukemia get so sick from the radiation that the treatment which might save them has to be stopped. Vomiting, nausea, loss of appetite, weakness, exhaustion or prostration are the symptoms of the radiation sickness

Good to excellent relief of these symptoms was obtained in 65 of 82 patients when they were given dramamine before and after the X-ray or radium treatment, the Mayo Clinic group, Drs. John W. Beeler, Jan H. Tillisch and Walter C. Popp, report

Every one of the patients had previously had marked nausea from the radiation treatment and 53 of them had been vomiting as well. The dramamine was given to them in three doses: one pill half an hour to an hour before the radiation treatment, another an hour and a half after and a third three hours later. In four of the 13 patients who had a poor result from the dramamine, vomiting between doses made them unable to retain and absorb the drug

In order to rule out any psychological effect and make sure the good results were due to the drug, 23 patients with radiation sickness were given pills that looked just like dramamine and which they thought were dramamine but which actually were not. Only 13% of the patients in this group had good or excellent results, com-

pared to 79% in the group getting dramamine

Of the 82 patients who got dramamine, 15 complained of feeling drowsy or sleepy and three refused to take the pills after three to four days of continued sleepiness. But several of the patients getting the substitute pill, or placebo, also complained of drowsiness and dizziness

The striking likeness between the symptoms of air and seasickness or car sickness and radiation sickness is what led the Mayo group to try dramamine. Various other chemicals have been tried to relieve radiation sickness, including B vitamins and anti-histamine chemicals. Diamamine is an anti-histamine chemical, although there are other drugs with a more marked anti-histamine effect. In some cases, especially when the X-ray treatment is given over the upper part of the stomach region, a combination of dramamine and injections into the veins of vitamin B-6, or pyridoxine, gave better results, the Mayo doctors report, than either drug alone

Just how dramamine works as both preventive and remedy for motion sickness is not known. It may have a specific depressing effect on the vomiting reflex. This would explain its action in both motion and radiation sickness, at least in checking the nausea and vomiting. This does not explain why it relieves other symptoms such as the malaise, prostration and lethargy or lassitude that occur in both radiation and motion sickness. These, however, may be secondary to the stimulation of the vomiting reflex

"The action of dramamine," Dr. Tillisch suggests, "may be by means of relief of the primary and personally catastrophic symptoms of vomiting"

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proportions as are found in the population generally

Babies afflicted with the hemolytic disease also belonged to the ABO blood groups in normal proportions. There was a suggestive increase in number of Rh-positive normal babies belonging to group A and a decrease in the number belonging to blood group O. The increase, however, was not statistically significant

Science News Letter, October 15, 1949

MEDICINE

Rest in Bed Is Best Thing for Cold

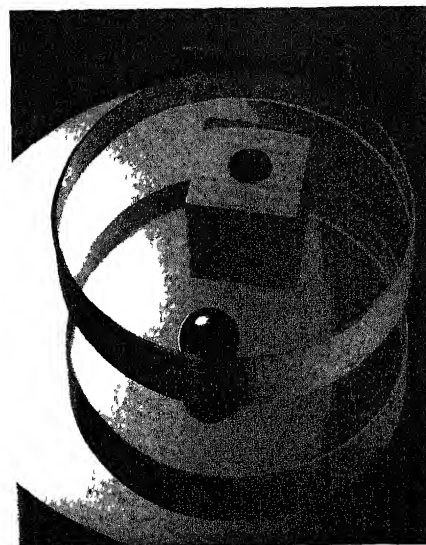
► **REST** in bed is the best thing to do for a cold, your doctor will read in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Oct. 8)

Alcohol "in reasonable doses" gets an okay in the treatment of a cold because it causes small blood vessels to dilate and reestablishes circulation in chilled surfaces such as the skin and membranes lining the nose and throat

Steam inhalations meet the "prime objective" of supplying moisture to the upper air passages during the earliest stages of a cold

Cathartics, laxatives, fluids beyond the dictates of thirst, special diets, vitamins, oral vaccines and gargles are considered ineffective. Nose drops and aspirin properly used relieve symptoms but do not cure and should not be overused

Science News Letter, October 15, 1949



HONORABLE MENTION—The photograph, which is a permanent record of the calibration of a half-inch ball bearing by the use of optical flats, won honorable mention in the black-and-white section of the 1949 Photography-in-Science-Salon held in Washington, D. C., Oct. 3-30.

MEDICINE

Rh Tied To Blood Group A

► **WOMEN** whose blood belongs to group A are more likely to be Rh negative and to give birth to babies with the dangerous hemolytic (blood-destroying) disease of the new born than women whose blood belongs to groups O, B or AB

Figures showing this are reported by Drs. S. P. Lucia, Marjorie L. Hunt and John C. Talbot of the University of California School of Medicine in the journal, SCIENCE (Sept. 30)

Discovery of this relation between Rh

sensitization and blood group A was made in the course of studies on more than 11,000 pregnant women during the years 1943-1948

In a sample of 228 sensitized Rh-negative women, 124 bore children afflicted with the disease. Of these 124, more than half, 66, belonged to blood group A. This is more than would be due to chance alone

Sensitized Rh-negative women who bore normal babies, however, belonged to the different blood groups in about the same

MEDICINE

Cortisone May Speed Brain

➤ CORTISONE, hormone chemical which has brought new hope to arthritis sufferers, may cause a "speeding up" of brain activity.

Brain waves, the records of the electrical activity accompanying brain activity, suggesting this are reported by Drs Edward W Bolland and Nathan E Headley of Los Angeles in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Oct 1).

The Los Angeles physicians were supplied with a small quantity of the scarce chemical by the manufacturer, Merck and Co. Trial in eight patients showed the same dramatic relief of arthritis reported with cortisone from the Mayo Clinic where it was discovered.

The extreme feeling of well being, technically termed euphoria, which the drug caused in addition to relieving pain, stiffness and disability, prompted the physicians to have brain wave records made of two patients before and after cortisone treat-

ment. In both cases there was an increase in alpha waves, suggesting that the chemical had caused a speed-up of brain activity.

Besides the marked improvement in severe arthritis while patients take large doses of cortisone, the Los Angeles physicians report that smaller doses helped three patients with less severe rheumatoid arthritis. The symptoms were "adequately but not not completely controlled," they report.

The finding, though on a small number of patients, has a bearing on the practical side, the scientists point out, because the chemical "promises to be scarce and expensive in the immediate future." Besides suggesting that patients might be able to get along fairly well on smaller doses, with less expense, there would theoretically be less chance of dangerous side effects, if these develop when the chemical is given for a long time.

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ENGINEERING

Mass Record Duplication

➤ SOUND tracks for motion pictures recorded on magnetic wire, tape, film or disks, and all other magnetic recordings, can now be reproduced by a new duplicating process which operates at high speed. It makes mass production of recordings possible.

The new magnetic record duplicating process was revealed at the National Electronics Conference in Chicago, by Marvin Camras of the Armour Research Foundation of the Illinois Institute of Technology where it was developed. The Foundation has been one of the leaders in magnetic recordings. It is a recording system which utilizes, in-

stead of the "grooves" on the disks of familiar musical and other records, a magnetic metal the degrees of magnetism of which are made to vary along its length with the sound received. When played back, the magnetic variations produce vibrations in a diaphragm that result in an exact reproduction of the original sound recorded.

As explained by Mr. Camras, duplicate copies of any magnetic tape recording can be made at high speed by printing from a master tape, disk or endless belt which runs in contact with a copy tape. Duplicating a wire record has been done successfully in laboratory experiments, but an economical

process is not yet developed.

Copy tape may be any of the standard tapes now in use. The master record is made on a tape of extra high coercive force so that it will not be harmed by the transfer field. The copy tape is brought into contact with the master tape, and while the two are together they are passed through a high frequency magnetic field. The influx of the master record, combined with the high frequency field, impresses a faithful copy of the master record on the copy tape.

Science News Letter, October 15, 1949

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MINING

Coal Gas by Electricity

Fuel gases may now be obtained from unmined coal by sending an electric current through the coal as it lies underground.

► FUEL gases from coal as it lies underground in its natural seams have been successfully obtained by sending an electric current through the coal, the University of Missouri revealed in Columbia, Mo. The accomplishment was made near Hume, Mo., on property and with the cooperation of the Sinclair Coal Co.

As described by Dr. J. D. Forrester, chairman of the university's mining department, the process consists of making drill holes from the surface into a seam of coal lying below. Iron pipes are inserted into the holes to serve as electrodes. Connected with the electrodes is a series of pipes a few feet above ground through which the gas flows when it is generated.

A current of considerable voltage, controlled by a water rheostat, is sent down through the electrodes into the seam. In the process of passing through the coal and overcoming its electrical resistance, the coal is heated and begins to give off oil-saturated gas. This gas comes to the surface through the pipes that serve as electrodes. These pipes are 20 to 40 feet apart.

After the coal bed becomes sufficiently heated so that it will burn and yield other gases, the electric current is stopped and air or oxygen is pumped into the coked and porous coal seam to sustain further combustion. This continues the supply of gases from the actual gasification of the underground coal.

The gases produced by this so-called electrocarbonization process can be used as raw material from which to make synthetic gasoline, or can be converted into a heating fuel. The gas produced is similar to the coke furnace gas of surface plants. Field tests were preceded by laboratory experimentation during which it was proven that coal can be turned into gas by an electric current. Both laboratory and field work was done by Erich Sarapu, a research fellow of the University's School of Mines and Metallurgy.

Several test runs on coal layers have been made during the past year. Some oil-tar has been collected at Hume along with the gas. In addition, laboratory investigation with oil-sand has resulted in the production of crude oil, as well as gas.

Fuel gases from underground coal are being successfully obtained by the U. S. Bureau of Mines in experimental work at Gorgas, Ala., in a joint project with the Alabama Power Company. No electric current is used, however, in the gasification process. Underground burning is employed.

Two holes are sunk into the coal seam,

and fire started in one by use of an incendiary bomb. Air under pressure is forced in to feed and spread the fire, and the gases of combustion are driven by the same air pressure to the second hole from the top of which they are captured. Somewhat similar work is being done in several European countries, particularly in Russia, where the scheme is said to have originated.

Electricity is used, however, in an oil-recovery process from oil shale in Sweden. A deep hole is drilled into the underground layer of shale, and an electrical heating element is lowered into the hole. The oil from the shale is driven off by the direct heat generated.

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MEDICINE

TB Helped by New Streptomycin Treatment

A METHOD of using streptomycin that may make the mold chemical more useful in treatment of tuberculosis has been discovered by Dr. Roger S. Mitchell of the Trudeau Sanatorium.

The usefulness of streptomycin, he points out, is "seriously limited" by the fact that the TB germs often develop resistance to the drug early in the course

of treatment of a patient. This makes the drug less effective as a remedy.

Doctors can avoid this, he believes, if they do not start giving the drug to patients with a cavity in the lung until the lung has been collapsed long enough to have a "satisfactory relaxing effect" on the cavity-bearing lung.

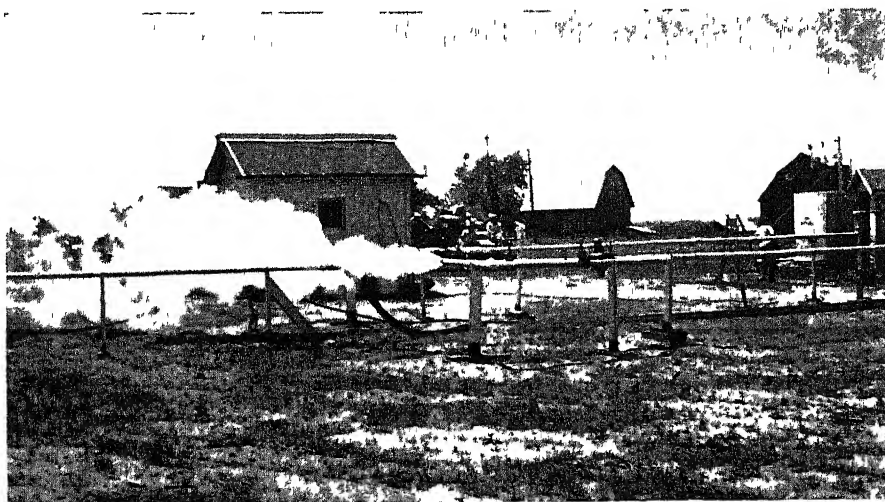
He bases this theory on the finding that streptomycin resistance rarely developed in the germs from patients who had no X-ray signs of cavities in their lungs before streptomycin treatment was started. Following this observation, a special study was made of 100 patients who still had TB germs in their sputum after the streptomycin treatment was completed. In 51 patients who had cavities and who did not get satisfactory lung collapse before streptomycin was started, 20, or 40%, had in their sputum, germs which were resistant to streptomycin at the end of the treatment.

But when no cavity was present at the start of the treatment, resistance to the drug developed in only three, or 11%, of 29 patients. And when cavity was present and satisfactory collapse of the lung established just before streptomycin was started, drug resistance developed in only two, or 10%, of 20 cases.

Although in some cases doctors may not wish to delay starting streptomycin treatment, Dr. Mitchell suggests that in the light of his observations on the patients, the value of utilizing at the same time the mechanical effects of collapse treatment with the effects of the drug on the germs "should be seriously considered."

Details of his study are reported in the *New England Journal of Medicine* (Sept. 22).

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GASIFICATION TEST—Gas is escaping from the pipe sunk into the coal in the production of fuel gases from unmined coal by the use of electricity. This method eliminates the "cost of mining" factor.

AGRICULTURE

Tractors Fight India Weed

➤ A GREAT battle, with American heavy tractors, to free 3,000,000 acres of land from the strangle-hold of a gigantic weed-grass, promises to save millions of India's teeming population from starvation.

That's what India's \$10,000,000 World Bank loan is to be used for. In the never-ending war on hunger, it will be used to launch a seven-year campaign against the rampant plant pest called kanks grass that renders a huge acreage in central India unfit for agriculture.

Kanks grass, a prolific plant, is as thick around as the butt end of a billiard cue and puts down roots as deep as seven feet into the soil. Indian plows are unable to budge it. The only way to kill it is to pull it up by the roots and expose them to the sun. For this muscular job India is buying 345 American heavy tractors.

Indian agricultural experts believe that with the aid of this modern equipment the death-grip of kanks will be broken. Like the American assault on the hedgerows of Normandy in the invasion of Europe, they will have to root out the deeply-entrenched

enemy field by field. After each skirmish, the dead plants will be hauled away, and the field will be immediately put to the plow. Spurred by the shadow of famine across their land, the Indians can not afford to lose time. As each field is cleared and plowed, wheat will be planted.

It will take seven years to rout kanks grass from this huge potential breadbasket. When the campaign is over, India will turn her heavy tractors loose on the remaining millions of acres of farm land still occupied by kanks grass. But that's for the future. This is a limited operation with limited objectives. But even on this limited scale the yield in food should go a long way to lessen the fearful pinch of hunger.

From the farmland which they expect to wrest from the grip of kanks grass, in the first seven years alone they expect to gain 5,200,000 tons of wheat. Huge though this quantity is, India will still have to import large quantities of foreign grain. But with victory over kanks grass, victory over hunger will be in sight.

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PHYSICS

Sun Future Energy Source

➤ THE sun, not the atom, may be the principal source of power for the world in future days, it was predicted at a meeting of the American Institute of Electrical Engineers in Dallas, Texas, by Frank R. Benedict of Westinghouse Electric Corporation, Pittsburgh.

Solar energy, he said, holds promise of supplementing our dwindling supply of coal, oil and natural gas, and may ultimately meet all the needs for power. It is common belief that in atomic disintegration we have an untapped source of practically inexhaustible energy, he continued, but this is not true. Limited amounts of the two fissionable elements, uranium and thorium, will control the broad scale applications of atomic power.

It seems very unlikely that atomic power will ever supply any large proportion of our total energy requirement, he asserted.

While "unrenewable" sources of energy such as coal, gas and oil now are our principal power sources, they can continue to provide all energy requirements for only another 100 to 300 years. Beyond that, the "continuous" sources, such as the sun's radiation, vegetation growth and waterfalls, offer chief hope.

To harness this energy, scientists still must devise means of capturing energy now lost when the sun's rays are reflected off the earth's surface. They also have to find out how to increase the amount of solar energy converted by the earth into

combustible materials such as wood, and the amount converted in the waters of the earth, causing water evaporation.

The water of our earth absorbs much of the sun's energy falling upon it. Most of the energy expended in evaporation is not recoverable. But the amount of energy that is theoretically recoverable is about 54 times our total energy requirements.

The engineer's dream, he stated, is the direct conversion of the sun's radiation into electrical energy. Along these lines, intensive research aimed at photo-chemistry, thermo-electricity and photo-electricity is now under way at Massachusetts Institute of Technology and other institutions.

Science News Letter, October 15, 1949

PHYSICS

Geiger Counters Measure Depth of Snow

➤ GEIGER counters are now being used to measure snow depths in Western mountains.

This technique was reported by Walter Wilson of the U. S. Weather Bureau at a symposium on mass and heat transfer from snow, lakes and ground surfaces held at the University of California at Los Angeles.

Actually the snow itself is not radioactive, but a bit of radioactive cobalt placed beneath it is. By recording how much the

clicking of the Geiger counter decreases or increases, the depth of the snow bank can be accurately determined.

Mr. Wilson, a member of the Weather Bureau's snow-investigating team which worked last winter in the High Sierra, said that the Geiger counter technique was the most successful of six methods of measurement employed.

Snow was an important item on the agenda of the two-day conference, sponsored by the U. C. L. A. engineering department. This was because, as Mr. Wilson indicated, mountain snow packs are the "primary sources" of Western rivers which supply many Pacific Coast cities with water.

The need for increasingly accurate methods of measuring evaporation and run-off was stressed. Without more accuracy in this respect, prediction of available water supply for Western cities is an uncertain affair, he pointed out.

Science News Letter, October 15, 1949

MINING

Synthetic Liquid Fuel Production Areas Sought

➤ MANY areas in the United States are suitable for plants for the manufacture of synthetic liquid fuel from coal, oil shale or natural gas as a raw material, recent surveys under government sponsorship show.

Desirable areas, in addition to the necessary raw material, must have plenty of water for plants of large capacity. If coal is the raw material, it should not be types of good coking quality because these are more valuable for other purposes.

Sample surveys already made cover portions of four states. These areas are in western Kentucky, where strip and underground coal are available; northeastern Colorado, with both oil shale and coal; southeastern Texas, with natural gas; and southeastern Montana with strip coal. No efforts were made in these surveys to select specific sites for plant construction. The objective was to determine general areas where all plant requirements can be met.

The surveys were made by the Army Corps of Engineers and by a commercial firm. This group, Foid, Bacon and Davis, Inc., of New York, has been awarded a contract for a nation-wide survey. Summary reports of the four surveys have been compiled by the Corps of Engineers and issued by the U. S. Bureau of Mines.

For detailed study and comparison, general areas within each of the four sample survey states were examined critically with reference to eight major factors, according to Dr. James Boyd, director of the Bureau of Mines. These include raw materials, water supply, power supply, access transportation, labor and housing, marketing, waste disposal facilities, and strategic considerations.

Science News Letter, October 15, 1949

ELECTRONICS

Color Television Progress

The all-electronic system of color television in which three colors are sent and received on the TV scope at the same time has been demonstrated.

► THE all-electronic system of color television which the Radio Corporation of America announced several years ago as forthcoming was demonstrated to members of the Federal Communications Commission and a group of scientists and press representatives in Washington, D. C. It is a system in which three primary colors are sent and received on the TV scope at the same time.

As explained by Dr. E. W. Engstrom of RCA Laboratories, this system requires no changes in present transmission standards. Transmitting stations can change at will, either from color to black-and-white or the reverse, without requiring adjustments to either the black-and-white or the color receiver and, therefore, without loss of audience.

Existing television sets will be able to receive in black-and-white programs transmitted in color without any modification whatever and without any converter or adapter. Existing black-and-white sets, however, will not be able to receive pictures in color without a special color adapter.

In this all-electronic system, a color camera at the transmitting end produces three signals, one for each of the three primary colors of green, red and blue. These signals are sampled electronically in rapid sequence and combined. The mixture is then broadcast as a single signal.

At the receiver, the mixture is separated, so that the signal representing each color goes to an electron tube which produces pictures in that particular color. Each is fed to its particular kinescope, and then the three colors are projected simultaneously to produce the completed picture in perfect color register.

The RCA system is known as a simultaneous one because it sends the three primary color signals at the same time. The system of the Columbia Broadcasting Company is known as sequential because its colors follow one another onto the screen at high speed, so rapid that the colors affect the eye almost simultaneously. The CBS system has already been demonstrated before the Federal Communications Commission and at many places during the past year or two, including at medical meetings to permit doctors to witness by television actual surgical operations in hospitals. It is said to utilize scanning disks in a method somewhat similar to that used in colored motion picture.

At its demonstration, Dr. Peter C. Goldmark, inventor of Columbia's color television system, presented a tiny converter which will change black-and-white pictures to color. It will do this only on television receiving sets that have been adapted to receive color broadcasts in black-and-white.

The eight-ounce device contains a small motor which operates on household current. The motor whisks a tiny color disk containing the three primary colors, red, green and blue. The disk is synchronized with the color as broadcast. However, before this converter can be used, the receiving set must be adapted to color broadcasts in black-and-white.

Present TV sets can be modified to receive in black-and-white broadcasts over color TV channels at relatively low cost, David P. Smith of the Philco Corporation recently stated. But to take the modern black-and-white set and adapt it to receive color would cost between \$250 and \$273, he said.

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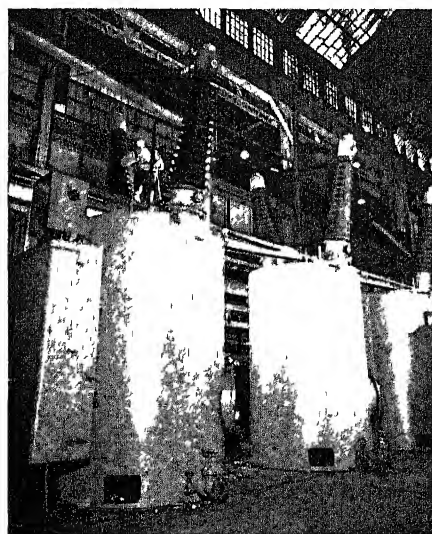
Feynman, the time-sense of the particle is reversed and it moves backwards in time. It is a position.

These "turn-arounds" have often been seen in the laboratory, particularly in cosmic ray studies. Often two particle tracks come from the same spot in the picture, one particle with a negative and one with a positive charge. According to conventional description, an electron-positron pair is said to have been created at the point from which the particles emerge.

The new wrong-way electron description explains this process by saying that a positron, a wrong-way electron running backwards in time, has been bumped and turned into the right time direction, becoming a normal electron. No pair was produced, it was a turn-around.

Predetermination takes a reverse twist in the new theory. It is quite possible for an electron to meet itself coming back from a place it hasn't yet been to. To point up this view, Prof. Feynman says, "this view is quite different from that of the (conventional) Hamiltonian method which considers the future as developing continuously out of the past. Here we imagine the entire space-time history laid out, and that we just become aware of increasing portions of it successively." He also adds that the time order of events during a collision is irrelevant.

Science News Letter, October 15, 1949



CIRCUIT BREAKER—The 10,000,000 kilovolt-ampere circuit breaker will assure hair trigger control of the tremendous electrical energy generated at Grand Coulee Dam. When the tanks are filled with oil, the giant assembly built by Westinghouse Electric Corporation will interrupt the flow of power in one-twentieth of a second.

PHYSICS

Wrong-Way Electrons

► TIME runs backwards for electrons bumped too hard in atomic collisions. For these wrong-way, upside down electrons, everything is backward. They start from where they haven't been, and they speed to the place they were just an instant ago, Prof. R. P. Feynman of Cornell University reports to the scientific journal, *PHYSICAL REVIEW* (Sept. 15). Even their charge is backwards, being positive instead of negative.

Usually called positrons by physicists, these wrong-way electrons have long been a paradoxical problem to the theorists.

Nobody wanted them when they first turned up in the mathematical description of the electron that fitted in with the theory of relativity. At first they were an embarrassment to physicists because no one had ever seen such a particle. Later when pictures of positrons were found in some cosmic ray studies, sceptics had to take the theories seriously.

Usually when a speeding electron hits something, it is deflected in a new direction and continues on its way. However, if the electron is hit too hard, according to Prof.

AERONAUTICS-AGRICULTURE

Airplane Is Economical Farm and Forestry Tool

► THE airplane is proving itself as an economical and efficient farm and forestry tool, officials of the U S Department of Agriculture in Washington, D C stated. In spraying operations, a single plane treated in a half-hour an area seven or eight times as great as would have been covered by a ground crew in a normal spray season of about six weeks.

Reseeding a burned-out forestry area cost half the amount that would have been required by hand in an airplane reseeding test made in the winter of 1948 on a severely burned area in York county, Maine, following the disastrous forest fires of the preceding fall. It was a test by the U S Forest Service to determine the most economical way of restoring burned acreage.

In the Maine reseeding, white pine seed was used. To get good distribution on the ground, the seed was mixed with from three to ten times its bulk in sawdust. The seeding was done while snow was on the ground, an effective procedure to protect the seed from the small rodents who are likely otherwise to eat much of it. First season counts show a fairly satisfactory germination. Forestry officials predict that airplane reseeding may prove to be a cheap method of quickly restocking the large severe burns that occur occasionally in the United States.

In a 1949 spraying test against the gypsy moth made in northeastern states, the spray was a concentrated formulation blown out in fine droplets. It was a cooperative experiment, with entomologists of the U S Department of Agriculture working with local state officials.

The economy and effectiveness of this newly developed method of control, government agents said, offer the best hope for practical control of several forest pests. A principal advantage is the ability to cover a great area within the short season during which the insecticide is effective against some stage of the particular insect pest. The quantity applied in forest protection, sometimes as little as two quarts to the acre, has relatively little effect on other life in the area, birds, fishes, and beneficial insects, government entomologists assert.

Science News Letter, October 15, 1949

AERONAUTICS

Turbo-Jets Will Fly 500 Miles Per Hour

► TRANSPORT planes of 1955 will be powered by four turbo-prop engines, will carry from 50 to 58 passengers on flights from 830 to 3,500 miles, will fly at 35,000-foot altitudes, and will travel at some 500 miles an hour, it was predicted at

the meeting of the Society of Automotive Engineers in Los Angeles, Calif.

Instead of turbo-props, turbo-jets may be used. The turbo-prop uses a gas turbine to give one-way rotation to a shaft to which conventional bladed propellers are attached. The turbo-jet is the jet-propulsion engine. Part of the high-pressure gases generated are used in a turbine to power the compressor which provides air for combustion.

The present reciprocating engine may be outmoded by 1955, the turbo-propeller engine well advanced, and the turbo-jet coming into its own, the engineers were told by Donald S. Jordan of Pratt and Whitney, East Hartford, Conn. He predicted that turbo-jet engines might be larger and quite different from those now in use.

Transports of 1955 will have to operate from local airports as well as from major terminals to build up volume business, according to Carlos Wood, Douglas Aircraft Co., Santa Monica, Calif. Their extreme range needs to be about 3,500 miles, the distance from America to Europe.

Science News Letter, October 15, 1949

MEDICINE

Radar Device Helps Detect Gallstones

► SURGEONS in the future will be able to use a radar device to detect and locate gallstones, bullets, shell fragments, bits of glass or wooden splinters in the body if a technique developed at the Naval Medical Research Institute, Washington, D C, proves as successful in practice as it has in the laboratory.

By this technique, ultrasonic energy (high frequency sound waves), generated by a quartz crystal, are transmitted into the body tissue from the instrument in direct contact with the skin. Reflections of these waves occur from the bones, and from any foreign substance that possesses different acoustical properties from the surrounding tissues. Thus, a gallstone, a shell fragment, a bullet, a piece of glass or a wooden splinter will reflect a portion of the energy that strikes it. The reflected waves are transformed into electrical pulses, which are then amplified and displayed on a cathode ray oscillograph screen.

In this way a foreign body which may or may not be visible by X-ray, appears on the screen as an "echo," in much the same manner as a plane in the sky appears on a radar screen. The distance of the echo from the initial pulse gives the depth of the foreign body in the tissues.

The method was developed by Dr. George D. Ludwig of the Naval Medical Research Institute in collaboration with the Harrison department of research surgery at the University of Pennsylvania.

Science News Letter, October 15, 1949



AERONAUTICS

Stresses in Jet-Powered Speedy Planes Studied

► THE terrific stresses in airplanes resulting from the use of powerful, high-speed jet-engines are responsible for more intensive investigations now underway to determine whether military planes are strong enough to withstand them. The study is spear-headed at the Wright-Patterson laboratories of the U S Air Force, Dayton, Ohio, but the nation's best aircraft designers will help.

Just started is an investigation into the structural flight loads, characteristics and limits of two modern jet fighters, the F-80 and the F-84. The program is planned to include two bombers, the jet-powered B-45 and the reciprocating-engine-powered B-50. A contract has been awarded the Curtiss-Wright Corporation, Columbus, Ohio, to install measuring devices with which to obtain control surface loads and related time histories of surface position and airplane attitude.

More than 30 channels of information will be collected on an automatic recording oscillograph, Curtiss-Wright officials said. They will show complete control position, strains, air speed, angle of attack, temperature and other factors affecting the airplane's flight.

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ENGINEERING

Possible Future Lighting System Uses Plastics

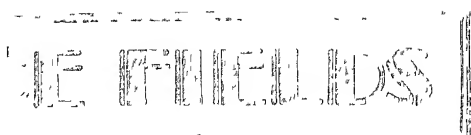
► LUMINOUS ceilings, made of plastic through which glareless light comes, may be the lighting system of the future.

Mounting many lamps behind a translucent plastic is the most completely adequate way of lighting a room, a special committee on lighting at Massachusetts Institute of Technology reported in Cambridge, Mass.

Luminous ceilings are made by hanging fluorescent lamps from a ceiling that has been painted white. About a foot below the lights, covering the whole ceiling, is a thin sheet of plastic that allows the light to gleam through.

Another suggested way of achieving the same lighting effect is to use special overhead light fixtures. These are two half-cylinders, an upper one of transparent plastic and a lower one of diffusing plastic. When looking up at a ceiling thus lighted, both the lamps and the ceiling itself appear to have the same brightness.

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GEOLOGY

Prospecting from Air 100 Times Cheaper

➤ MODERN mineral prospecting is 500 times faster and 100 times cheaper than it was before the war. The "astounding developments" that make this possible spring from World War II, just as the two earlier chapters in prospecting history were preceded by great wars.

World War II produced improvements in geologic instruments and planes suitable for carrying them. In three hours such a specially-equipped plane can survey 450 miles of terrain. A team of men on the ground would have to put in a full day to survey about a mile.

These statements were made by Dr. Hans Lundberg, president of Lundberg Explorations of Toronto, before geologists assembled to celebrate the seventy-fifth anniversary of the Colorado School of Mines in Golden, Colo.

Because "it has now become possible to realize the prospector's dream of geophysical exploration from the air," Dr. Lundberg said, "geologists will be able to discover the mineral possibilities of the large unexplored areas of the earth."

American prospecting, Dr. Lundberg declared, falls into three distinct periods, each with its own methods, and each "preceded by a Great War." The wars referred to are the Civil War and the two World Wars.

By combining aviation and electronics the present striking savings in time and money have been accomplished, he said. The post-Civil War period was a pick-and-shovel era, prospectors were mostly wandering Civil War veterans, and discoveries were mostly luck. Some experienced prospectors in time "developed an ore-finding sense," Dr. Lundberg said, but this random skill did not become organized into a science until after the first World War.

In this second phase scientific prospecting came of age. Sensitive instruments for measuring gravitational and magnetic pull and electrical impulses were developed. The necessity for moving this equipment from place to place on the ground was time-consuming and costly. Moreover, ground readings must be taken at intervals of 50 feet or so, whereas air surveys give continuous measurements.

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AERONAUTICS

On Again, Off Again Will De-Ice Planes

➤ INTERMITTENT heating is more efficient than continuous heating for de-icing

airplane surfaces such as wings and propellers under extremely heavy icing conditions.

So says Dr. Myron Tribus of the University of California at Los Angeles department of engineering.

Although intermittent heating has been used for some time in the de-icing of propeller blades, heavier and more costly continuous heating devices are used for de-icing the other plane surfaces.

Dr. Tribus' studies at UCLA show that in intermittent heating the formation of ice liberates heat which can be utilized. Continuously-heated surfaces are constantly above freezing and thus are not able to take advantage of the heat liberated by the fusion of ice.

Intermittent heating, therefore, is thermodynamically more efficient for all phases of de-icing in addition to requiring lighter equipment than continuous heating devices.

Other results of the research show that two-thirds of the energy from heaters used to de-ice propellers is wasted in the blade rather than being used to melt ice. The study indicated that placing the heaters inside the blade may result in more effective ice protection than placing them outside.

The research was done with the aid of UCLA's new Thermal Analyzer, a device which produces an electrical circuit analogous to thermal conditions of the plane surfaces.

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METALLURGY

Aluminum Scrap Yields Pure Aluminum

➤ ALUMINUM scrap containing silicon and iron can be made to yield its aluminum by a new U. S. Bureau of Mines process which involves dissolving.

The aluminum is dissolved in molten zinc and the zinc is then distilled from the aluminum. Both laboratory and pilot-plant distillation tests have been made.

To obtain pure aluminum by direct reduction of clay or siliceous bauxite in an electric furnace requires a practical, inexpensive method for refining aluminum-silicon alloy.

Most pure aluminum today is produced commercially by an electrolytic process, not by direct smelting of siliceous aluminum ores.

Containing information on tests made, a Bureau report covers the production of crude aluminum by carbothermic reduction, multi-stage reduction, and data on the boiling points of zinc-aluminum alloys. Copies may be obtained free from the Bureau of Mines, Pittsburgh, Pa.

The title is "Recovery of Aluminum from Crude Aluminum-Silicon Alloy by Extraction with Molten Zinc."

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BIOLOGY

"Osmotic Shocks" Burst Viruses, Leave Ghosts

➤ A NEW kind of killing agent, "osmotic shock," was reported by Dr. Thomas F. Anderson of the University of Pennsylvania at the meeting in Washington, D. C., of the Electron Microscope Society of America.

The victims of osmotic shock are special kinds of viruses which prey on bacteria. These viruses which attack some germs that attack man were formerly called bacteriophages. As scientists have learned more about them, that name has been discarded. The ones whose osmotic shock destruction was revealed by electron microscope pictures are called T2, T4, and T6.

The shock comes when the sodium chloride, or salt, solution the viruses have been living in is rapidly diluted with water or with solutions of ethylene glycol, glycine, glycerol, and either of the two sugars, glucose or sucrose. After the osmotic shock of this rapid dilution, virus "ghosts," empty head membranes with tails attached, are left. The membranes are the outside envelope of the virus, like the skin of a man.

"Presumably," Dr. Anderson said, "the virus heads swell when the osmotic pressure is suddenly reduced, and actually burst if the reduction is sufficiently large and sudden."

The small, odd-numbered viruses, T1, T3, and T7, were not affected by the osmotic shock. Electron microscope pictures of these show that they do not have membranes.

Science News Letter, October 15, 1949

CHEMISTRY-INDUSTRY

"Armalon" Is Used for Truck Seat Upholstery

➤ A TOUGH, strong and pliable plastic-covered fabric, first being applied to truck seat upholstery, has been developed by Du Pont by chemical changes in the ethylene chemical compounds such as are now coming into the synthetic resin field.

Fundamentally made from coal or petroleum, the new material, whose exact nature is still secret, has been trade-named "Armalon" ethylenic plastic.

Brawny truck drivers bounced by rough roads break the springs of the cushions they sit on before the new fabric wears through, it is claimed. The new plastic will not stiffen in use because it needs no plasticizer or softener in its manufacture. It gets along with sponge rubber, not affecting it or being affected by the anti-oxidant additions. Seven-year tests show that it can stand all sorts of weather.

First available for trucks, it will later be offered for other purposes.

Science News Letter, October 15, 1949

GENERAL SCIENCE

Awards Await Winners

The Ninth Annual Talent Search will be climaxed by the awarding of scholarships to the forty winners for further development of their science talent.

By MARGARET E. PATTERSON

➤ A BOY or girl in the senior class of the high school near you may be a future Einstein or Curie

Those neighborhood kids you have watched grow up with their model airplanes, experimental animals, homemade telescopes, whining electronic gadgets and chemical conglomerations may be the ones who will be changing our world of the future

A great search for youngsters with inventive flare and creative genius in science is now on.

Finding Scientists

You can help find these scientists of tomorrow by telling the talented boys and girls you know that scholarships for further training in science are waiting for them

Like hundreds of others before them they may be nationally recognized and speeded along to scientific productiveness by winning in the Science Talent Search for the Westinghouse Science Scholarships, conducted annually by Science Clubs of America, administered by Science Service

A total of 320 young scientists have been discovered through this search since 1942. These winners, along with 2,080 named as honorable mentions, are now enthusiastically pushing back science frontiers

Youthful Scientists

Do high school seniors seem too young to be taken seriously as scientists? During the eight years of the Science Talent Search the records, made by the young scientists named for honors, have convinced scientists and the public in general that a high school senior with a talent for science is a rare and very valuable individual

As a sample of their accomplishments let's look at the records of eight typical winners, only a few months or a few years removed from their high school graduation.

H S Graduate 1949—During three summer vacations a high school boy roamed on foot and by boat studying and collecting mollusks (clams, snails, etc) on a tiny island off the Atlantic coast. When he wrote the results of his diligent explorations he had raised the number of known species on the island from 46 to 120. His careful analysis of the mollusks that once lived on that island and those that do now is so highly respected by authorities in the

field that the work is being published by a large eastern university. The 17-year-old boy, Dwight Taylor, is now a freshman at the University of Michigan, continuing his study of paleontology

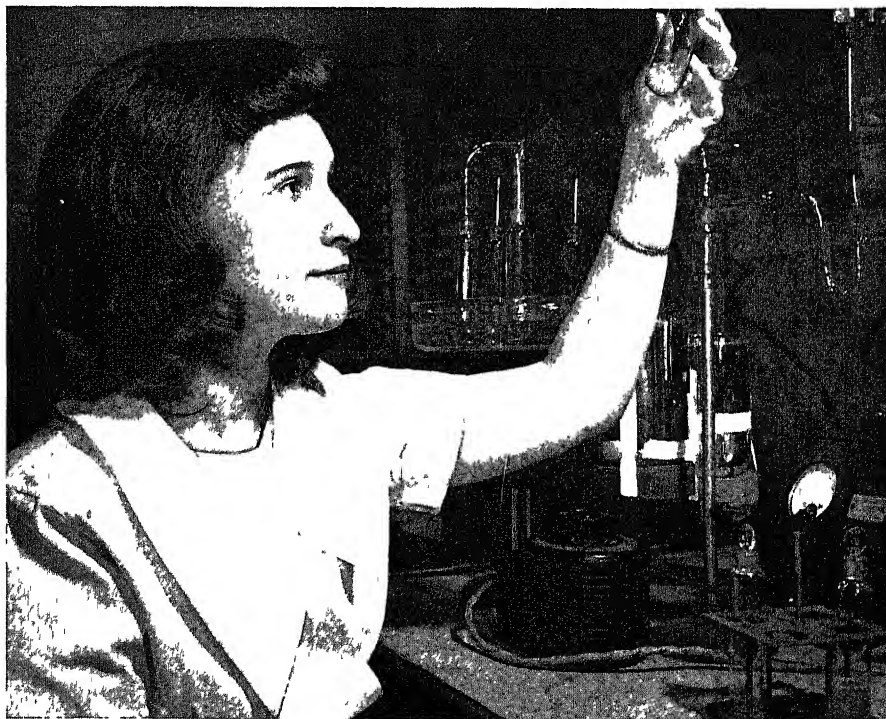
H S Graduate 1948—Making organic chemicals combine may be dangerous because of the constant threat that the reagents used can explode. A high school boy, whose hobby has been chemistry since he came to the U S A from Hungary as a child, was intrigued by this problem. In 1948 he announced success in his quest for chemicals to replace the dangerous ones in a paper so important it was reported in full in two national magazines for professional chemists. The 17-year-old, Andrew Kende, is now a sophomore at the University of Chicago, majoring in organic chemistry

H S Graduate 1947—At an age when most girls are still playing with dolls, one was learning about microscopic plants and animals. By the time she was a high school

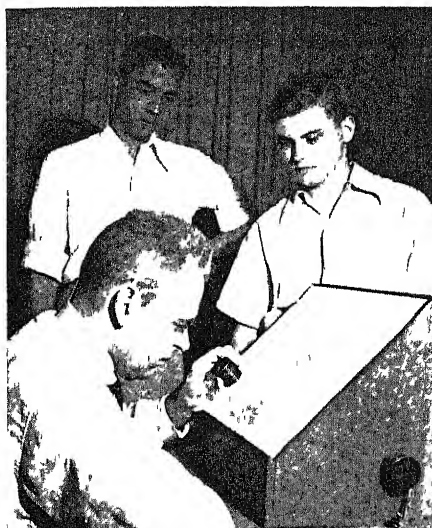
senior her knowledge of *Drosophila melanogaster* (fruit flies to you) was so advanced she was the working partner of a college professor of genetics. Today ability like hers with micro-techniques assures you safety if you are prescribed either of two still rare, new antibiotics. All this past summer she has painstakingly standardized the reactions of bacteria to chloromycetin and neomycin at the Cold Spring Harbor station of the Carnegie Institution of Washington. She is Rada Demetec, 19-year-old junior at Swarthmore College, majoring in biology and considering medicine as a career

H S Graduate 1946—Nuclear physics has interested one young man as long as he has known about science. By the time he was a high school senior, he had built his own cosmic ray counting apparatus and could compare its results favorably with that of equipment available commercially for many times the price.

When he entered the University of California at Berkeley he began to help in the Radiation Laboratory on assignments far beyond those usually given to a college freshman. Now a senior there, he holds the position of senior lab technician in the same laboratory where he has worked



RESEARCH CHEMIST—Mrs. Joan Kunkel Tanner, M.S., a winner in the 1943 Search, is a chemist for Eastman Kodak Company. Here she works with high-vacuum apparatus to remove solvents from gelatin solutions in her research to improve photographic film.



COMET DISCOVERY—The Harvard team which discovered the Bappu-Bok-Newkirk Comet examine the photographic plate of the new comet. They are Vainu Bappu (standing left), graduate student from India, Gordon Newkirk (standing right), 21-year-old college senior, 1946 winner, and Dr. Bart Bok, associate director of the Observatory.

off hours and summers for his whole college career.

The work David Cudaback does for an Atomic Energy Commission project is on the classified list so we can only guess at the seriousness of it.

H. S. Graduate 1945—On July 1, 1949, the USS Norton Sound left the West Coast bound for six weeks in the Pacific. On board, a party of scientists, jointly sponsored by Princeton University and the Office of Naval Research, was seeking information about cosmic rays in order to

shed further light on nuclear burst processes. Among them was Kirby Dwight, Jr., 21-year-old graduate physicist from Princeton, getting his first taste of in-the-field atomic research, and helping to find one more key to the riddle of atomic power.

H. S. Graduate 1944—Graduating from high school at 14 is looked upon with some wonder, but when a boy does that and also wins one of the big scholarships in a national competition for young scientists the wonder grows.

An Alabama boy in 1944 had done such advanced work with thioplastics that even the judges of the Science Talent Search were amazed. He went on at his rapid stride to graduate at 17 from Massachusetts Institute of Technology and to accept a job with DuPont.

By going to school at night, he earned a master's degree at 18 from the University of Delaware. Then getting a leave of absence from his job he enrolled at Caltech. In August, 1949, at 20 he is Dr. Rodman Jenkins, Ph.D. in chemical engineering, to prove that promise at 14 can be a reality at 20.

H. S. Graduate 1943—Mathematics is basic to all sciences and often is so basic to new discoveries that it must be kept secret. This is true of projects like one being done for the Office of Naval Research at Cornell University. Working on it is Dr. Murray Rosenblatt, 23-year-old Ph.D. in mathematics from Cornell.

H. S. Graduate 1942—At the Lewis Flight Propulsion Laboratory of the National Advisory Committee for Aeronautics in Cleveland, Ohio, fuels adequate for jet planes must be perfected. Selecting, synthesizing and testing new and better hydrocarbons is the job of men like Dr. Wolf Kato, 25-year-old Ph.D. from Cornell University. Since his arrival from Germany shortly before World War II, he has never deviated from his goal of becoming an organic chemist.

New Search Begins

The Ninth Annual Science Talent Search, now on, will locate other young scientists like these spotted during the past eight years.

The 16,000 boys and girls expected to enter the competition this year have been busy with practical experience in science during their vacations and are now back at their high school studies. Seniors in public, private and parochial schools will report on the results of their investigations and experiments in a 1,000-word essay on "My Scientific Project," one of the requirements of the Science Talent Search which ends Dec. 27, 1949.

The 40 chosen as winners will be announced early in 1950 and will be invited to the five-day all-expenses paid Science Talent Institute in Washington, D. C., in March. Here one boy or girl will be selected to receive a Westinghouse Grand Science Scholarship of \$2,800, one of \$2,000 will go to the runner-up. Other trip winners

will receive scholarships ranging from \$100 to \$400, all made available through the Westinghouse Educational Foundation.

In 15 states where State Science Talent Searches have been set up to run concurrently with the national competition, the fortunate entrants will have a double chance of placing in the national or state contest and are thus assured of additional opportunity for college education.

Successful Experiment

The Search was started as an experiment by Science Service and the Westinghouse Electric Corporation to provide an adequate supply of promising young scientists for the continuing development of American science.

The experiment has indicated clearly that talented young scientists can be located by the time they are high school seniors. Scholarships and recommendations have made it possible for hundreds of boys and girls, who might not otherwise have had the incentive or financial assistance, to continue their education in science and to develop further their rare gifts of science talent.

With this country thrust more and more into a position of world leadership in science this successful experiment is of even greater value to the strength and security of the United States than when it was originally planned.

Young Scientists Everywhere

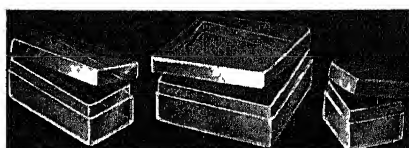
Size of school and its geographical location seem to have very little to do with winning in the Science Talent Search. Promising young scientists appear to be almost everywhere in the U. S.

Winners receive handsome bronze plaques to present to their schools. Forty proud high school seniors will be giving them to their schools next spring at commencement time. Perhaps that high school near you will be getting one for the first time or adding a new one to its collection. They will signify 40 more boys and girls launched on careers of service through science.

Complete details of the Ninth Annual Science Talent Search may be obtained by writing to Science Clubs of America, 1719 N. St., N. W., Washington 6, D. C.

Science News Letter, October 15, 1949

Transparent Boxes



Offer maximum protection with complete visibility for specimens of all kinds, small parts, etc. Innumerable uses for these convenient boxes.

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MEDICINE

Hormones Aid Arthritics

➤HOPE for chemical conquest of arthritis and related diseases grows from encouraging results of a trial of three non-scarce hormone chemicals in treatment of the disease

The chemicals used are male and female hormones or derivatives of these. Their names are testosterone propionate, estradiol esters, and pregnenolone. They belong to a class of chemicals known as steroids. Steroid chemicals are also believed to be a possible starting source for cortisone, the adrenal cortical hormone which scientists at the Mayo Clinic discovered was effective in relieving arthritis pain and disability. Cortisone at present is synthesized from ox bile acids by a complicated process and is still very scarce.

The three sex hormone chemicals were given for from four to 12 weeks to 90 patients with rheumatoid arthritis. Of these, 81 "went into a remission," that is, were free of pain, swelling and morning stiffness and had a normal appetite and a sense of well-being.

These results are reported by Drs. William K. Ishmael, Arthur A. Hellbaum, John F. Kuhn and Miss Marv Duffy of the

McBride Clinic and the University of Oklahoma School of Medicine in the OKLAHOMA STATE MEDICAL JOURNAL.

Although the results are better than with any treatment previously used by the doctors, who have not yet used large doses of cortisone, they warn that the results and length of observation time "do not warrant at present the use of these substances as a 'treatment' or a 'cure'."

They caution further that these chemicals are "potentially dangerous when given over a long period of time." The value of the chemicals, in their opinion, is two-fold: 1. Since they are in plentiful supply and not too costly, they may provide a stop-gap treatment. 2. They may provide another clue to development of a real chemical remedy or cure for arthritis.

Science News Letter, October 15, 1949

CHEMISTRY

Heat, Oxygen Blamed for Color Fading of Juices

➤HEAT and oxygen are the real culprits causing the fading of stored fruit juices,

although the blame is often put on light.

Cool storage protects the color of fruit juice far better than dark storage, scientists at the Massachusetts Agricultural Experiment Station have reported.

Grape, tomato, cherry, curiant, raspberry, strawberry and blueberry juices were studied for color changes after six months' storage. Those with naturally high color suffered the most, cherry, grape and tomato juices being the most stable.

Science News Letter, October 15, 1949

On This Week's Cover

➤THE new supersonic jet fighter, the Vickers Supermarine 510, which was shown at the British Aircraft Constructors Display, Farnborough, England, is claimed to be capable of reaching a speed faster than sound. The Royal Air Force is to be equipped with this aircraft which is still on the secret list.

Science News Letter, October 15, 1949

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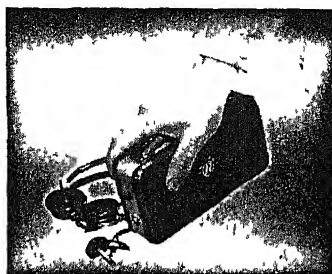
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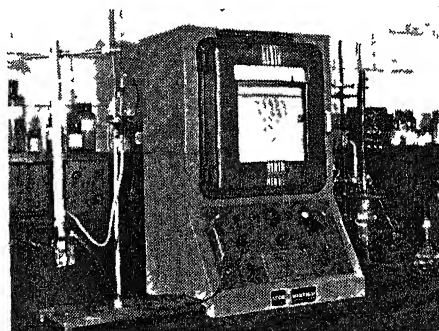
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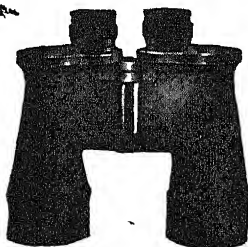
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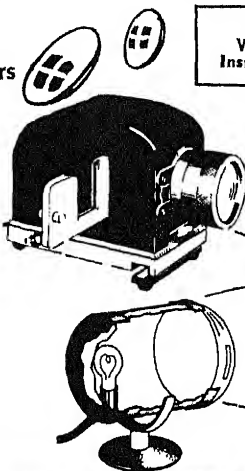
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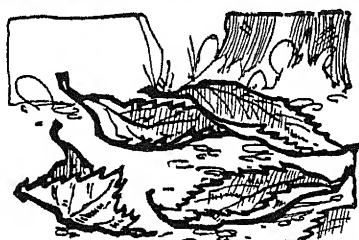
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Falling Leaves

➤ THE first leaf falls. Another follows. Then a third. Soon the leaves are falling in twos, threes, by the dozen, by the score.

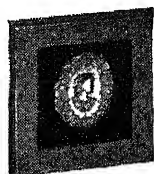
They come soaring down in dancing zigzag flight. When the wind blows they fall faster, and skip along the ground.

A falling leaf brushes the face of a man and a sharp sadness grips his heart. The man feels, not a brown leaf, but portents of his own mortality. The falling, skipping, dancing leaves do not fill him with frolicsome gladness. They set him to brooding.

For the man the falling leaves are an ending. They are an ending not alone of summer and warm sun, of the season of quick vitality. They portend a larger ending, of a year, of a hope, of some aspiration perhaps that has gone another twelve-month unfulfilled.

The man whom fall makes sad is surely a poet. But the man who thinks of autumn as a termination, with equal certainty is no naturalist.

Autumn is not an end point, but a needful natural turning point. It is the season of fruition and of preparation. It is a time for garnering all the lush and lavish products of the growing season. And it is a time when Nature, like a provident housewife, begins to set her house in order for the winter that lies ahead, and for the spring that lies beyond. A man seeing the leaves fall would be wise to prepare for the winter as well.



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Green leaves are as vulnerable to frost bite as ears of corn and man. A man, perhaps preoccupied in philosophizing grandly on doleful misty matters, might scoff at talk of ear-muffs and think it premature. But a tree, which has no cozy fire to scurry to when the air gets nippy, takes its measures early.

When the nights start to grow longer and chillier, the tree loses no time. All the liquid foodstuffs begin to drain out of the leaves, back into the limbs and trunk. The sugar, starch and protein that make the green leaf such a tasty tidbit to browsing animals are put into winter storage.

Then a chemical transformation takes place in the leaf. The green matter, the all-important chlorophyll that performs the miracle of turning sunlight into plant food, breaks down and becomes colorless. At this time the other colors, which have been in the leaf all the time but dominated by the larger amount of green, seem to burst forth riotously. The yellow, the reds, the purples, which turn autumn landscapes into speechless wonder, are microscopic bits of pigment or dissolved dyes in the cell-sap.

Meanwhile at the base of the stem of the leaf a double layer of a corky substance is forming. Eventually it splits, each half acting to bind up the open wound caused by the severing of the leaf from the branch.

The tree is sealed up for winter. The leaf, its usefulness over for the year, sails free, floating, planing, zigzagging downwards. The leaf falls, and it brushes the face of a man. The man feels, not a brown leaf, but a nameless portent in the autumn of his heart.

Science News Letter, October 15, 1949

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DIX ANS D'APPLICATION DE LA RADIOACTIVITE ARTIFICIELLE—Pierre Sue (with preface by M. Joliot Curie)—264 p. \$3.50. This work, which deals with the many ways in which radioisotopes are utilized, is of prime importance to American researchers who make use of this very new tool of science. Among the applications covered are the use of the radioisotope in chemical analysis, use of gamma rays in industry and metallurgy—a field rich in possibilities—use of radioactivity in biological research and in the treatment of cancer and other diseases, and use of radioactivity in tests of the efficacy of insecticides.

LES GRANDS COURANTS DE LA PENSEE MATHEMATIQUE—F. Le Lionnais—533 p., \$3.50. This is an encyclopedic work written to be understandable to the layman. It covers not only logic and mathematics but also physical chemistry and biology. Forty-five emi-

nent scientists contribute to the volume, each writing on some branch of mathematics, such as analogy, function, number, infinity, probability, and space and the interrelations with related branches of science such as pedagogy, logic and physics.

MECANIQUE ONDULAIRE DU PHOTON ET THEORIE QUANTIQUE DES CHAMPS—L. de Broglie—208 p., illus., \$9.00. It is the author who has developed since 1934 the wave mechanics of the photon. In this work he brings together, compacts, and amplifies results presented in previous publications, especially those which distinguish his theory from that of Jordan, Heisenberg and Pauli, the quantum theory of the electromagnetic field. The discussion is clearly presented and the author puts very well those questions that remain obscure in usual presentations.

LE POLISSAGE ELECTROLYTIQUE DES SURFACES METALLIQUES ET SES APPLICATIONS Tome I—Aluminium, Magnesium, Alliages Legers—P. A. Jacquet—359 p., illus., \$12.00. It is rare that a technique issues from the laboratory to become generally known and to have developed such a multitude of industrial applications as was the case with electrolytic polishing. Previously, metal structure had to be studied only after the surface had been cleaned by chemical attack or by mechanical friction. Even then surface irregularities were likely to falsify microscopic examination. Electrolytic polishing opened up new possibilities in micrography. Metallurgists and industrialists will read this work with great interest.

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FRIENDLY CHINA—Bailey Willis—*Stanford University Press*, 312 p., illus., \$5.00. The final, posthumous book by a noted geologist and earthquake specialist. It is a sketch of the author's two-thousand mile walks through the interior of China under the auspices of the Carnegie Institution. Many lovely on-the-spot pencil sketches by the author are included.

INORGANIC CHEMISTRY IN PHARMACY—Lloyd M. Parks, Paul J. Jannke, Loyd E. Harris, and John E. Chrusian—*Lippincott*, 298 p., illus., \$6.00. A textbook written with emphasis on the preparation, properties, testing and uses of inorganic chemicals used in pharmacy and medicine.

LIFE AMONG THE DOCTORS—Paul De Kruif—*Harcourt Brace*, 470 p., \$4.75. A chronicle of the fight by responsible men of medicine against human disease.

THE MEANING OF EVOLUTION A study of the History of Life and Its Significance for Man—George Gaylord Simpson—*Yale University*

Press, 364 p., \$3.75. A brief non-technical description of the rise and fall of the dynasties of life. The latest in the series of Terry lectures.

THE PRE-ELECTION POLLS OF 1948 Report to the Committee on Analysis of Pre-election Polls and Forecasts—Frederick Mosteller and others—*Social Science Research Council*, 396 p., illus., paper, \$2.50, cloth, \$3.00. Based on extensive studies of data on the polls and the election.

HUMAN PATHOLOGY—Howard T. Karsner—*Lippincott*, 7th ed., 927 p., illus., \$12.00. The most extensive revision this standard reference book has had.

STUDIES IN HUMAN BEHAVIOR—Merle Lawrence—*Princeton University Press*, 181 p., illus., paper, \$3.50. A laboratory manual in general psychology including experiments with which the student can learn how his senses function and how his previous experience affects his perception, sometimes causing weird illusions. Through these experiments, he can learn why men behave as they do.

TAKING YOUR BABY'S PICTURE—Emanuel Suci—*Greenberg*, 125 p., illus., \$2.95. How to catch those charming, natural looking pictures that every parent wants and how to develop and print them, too.

THE UNITED NATIONS: FOUR YEARS OF ACHIEVEMENT—Department of State—*Gov't Printing Office*, 35 p., paper, 15 cents. Major actions during the past four years summarized.

YOUR ACRES: What to do About Them—Dorothy Nye—*Funk & Wagnalls*, 80 p., illus., \$2.50. Some suggestions and exercises to aid in finding more enjoyment and less fatigue in your everyday work and play. The author is an authority on corrective exercises.

Science News Letter, October 15, 1949

AERONAUTICS

"Buzzing" by Pilots Should Be Reported

➤ THE United States government wants help in spotting reckless airplane pilots who "buzz" various objects or engage in other hazardous flying stunts. Procedures for reporting, in which the public is asked to participate, were announced by the Civil Aeronautics Administration.

Anyone who observes an airplane buzz-

ing houses, people or other aircraft should report by telephone to the nearest CAA office, and confirm the telephone report by a letter to the same office. D. W. Rentzel, administrator of CAA, states. All details should be given, including particularly the registration number of the offending craft. This is displayed on the left half of the lower surface of the wing, and on the vertical tail surface.

Science News Letter, October 15, 1949

Words in Science— BUTTERFLY-MOTH

➤ IT is not correct to assume that moths are only those pestiferous insects that devour a dress suit between formal parties.

Moths, as well as butterflies, can be beautiful. Here are some of the ways to tell them apart.

Butterflies have a club-shaped antenna with a knob on the end. Only a few rare tropical species of moths have this knob.

The pupae of butterflies are not protected by cocoons as are those of some moths.

Butterflies usually hold their wings up, when at rest. Moths generally hold them flat or fold them against the body.

Butterflies, as a rule, fly only in the daytime. Most moths are seen only at night.

Science News Letter, October 15, 1949

PHENOMENA, ATOMS AND MOLECULES

IRVING LANGMUIR

The Philosophical Library deems it a privilege to announce the forthcoming publication of Dr. Langmuir's work **PHENOMENA, ATOMS AND MOLECULES**. The eminent scholar, winner of the Nobel Prize and one of the country's pioneers in atomic research, has set down in this volume many of his thoughts, observations and conclusions.

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❄️ **SNOW REMOVER** to clean walks will clear a 16-inch path in snow up to 12 inches in depth, throwing the snow as much as 25 feet to one side. It is a two-wheel affair, with rubber tires and equipped with a 15-horsepower gasoline engine, and is guided by a handlebar from the rear.

Science News Letter, October 15, 1949

❄️ **WATER SKIS** for walking on water, unlike types which can be used only when towed behind a speedboat, are of usual length and width but have increased bulk in depth. Fins prevent any tendency of the ski to go backwards in this recently patented device, and the thickness of the ski prevents sideward drift.

Science News Letter, October 15, 1949

❄️ **WATER COOLER** for office use is a combination device which includes within its cabinet a spacious food or bottled drink storage compartment and three trays of ice cubes. The cooled drinking water is drawn from a faucet in a recess on one upright edge, the storage compartment is opened from the top.

Science News Letter, October 15, 1949

❄️ **LIGHTWEIGHT CHAIN SAW**, shown in the picture, can be used at the top of a pole to cut a 12-inch tree limb 15 feet above



the ground. This electrically operated device, with pole removed, can be used as a hand saw. A small gasoline engine generator supplies energy, or household current can be used.

Science News Letter, October 15, 1949

❄️ **HEATED SHOE TREE** for drying footwear after washing or dyeing uses an elec-

tric heating element inside the tree which is energized by the household current. The amount of heat created in this newly patented device is low to permit a slow drying.

Science News Letter, October 15, 1949

❄️ **PHOTO COPY OUTFIT**, complete in one movable compartment that occupies the office space of an ordinary wardrobe, produces in a few seconds exact copies of letters, drawings, photos and forms up to legal size. No special dark room is required, the unit operates in subdued office light.

Science News Letter, October 15, 1949

❄️ **HOSE RFFL**, that is attached to the side of a building and to which the hose is permanently attached, permits unwinding as much or little of the hose as desired. Water passes through the unwound part, its leak-proof hose connection is reversible.

Science News Letter, October 15, 1949

❄️ **BUILDING MATERIAL** of high elasticity, recently patented, is claimed as a superior product for shingles, wallboards and floor covering because it regains its original shape after being distorted by pressure. It is made of fibrous material blended with aluminum soap and a plasticizer.

Science News Letter, October 15, 1949

Do You Know?

Icebergs weighing 500,000 tons are not uncommon in the North Atlantic.

Some 3,200 American watch towers are maintained to spot forest fires.

Asbestos has been in use some 2,000 years in fire-protection.

North Carolina claims to have more kinds of trees and plants than any other state.

Some 25 years ago the Oil, Paint and Drug Reporter listed market prices for about 1,000 industrial chemicals, at present the number is over 5,500.

Only a remnant of the fur-bearing royal chinchilla of Peru is now left, these are high up in the Andes where law-breaking hunters find difficulty in reaching them.

The possibility of using carbon black to aid ice-breaking for navigation on rivers and in harbors is under investigation, carbon black on the ice would absorb heat from the sun and reduce the rate of ice growth, it is thought.

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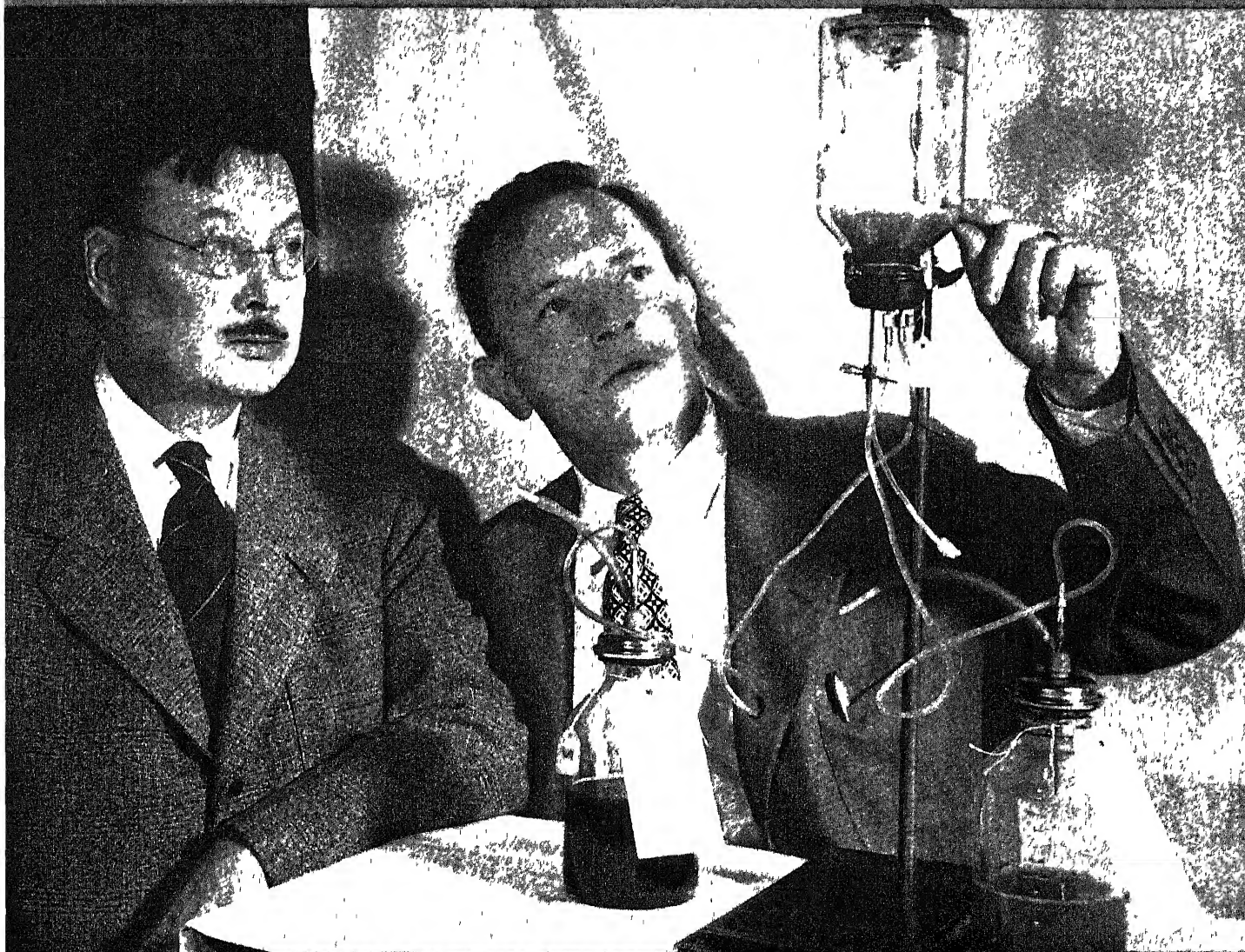
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OCTOBER 22, 1949

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



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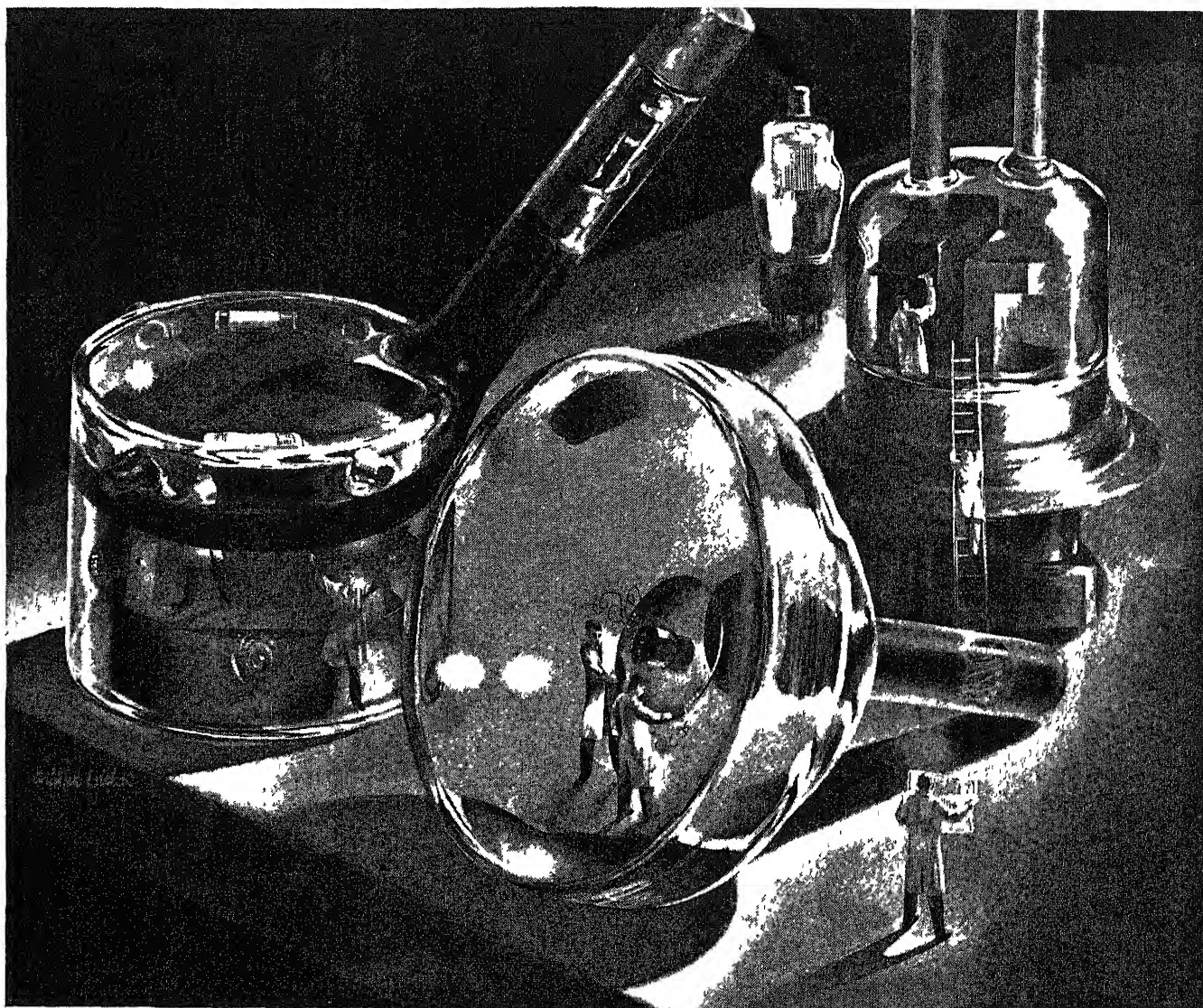
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New Delhi.

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VOL. 56 NO. 17 PAGES 257-272



Scientists at RCA Laboratories solve exacting problems within the "nothingness" of vacuum tubes

Inside story of Better Television

Now television is flashing *visual* entertainment, news, and educational material to millions of people. The "inside story" of its rapid growth is the history of some remarkable tubes. Inside these tubes, electrons are put to work—to perform, for your benefit, the miracle of long-distance vision.

The screen of your direct view television receiver is actually the face of a tube—the kinescope developed by Dr. V. K. Zworykin and his colleagues of RCA Laboratories—on which electrons in motion "paint" pic-

tures. A tube, too, is the "eye" of RCA's supersensitive Image Orthicon television camera, which can "see" clearly by the light of a match.

And since you asked for big-picture television, they developed projection receivers—also a way to "weld" glass and metal, thus speeding the production of 16-inch direct-viewing tubes at lower cost.

To these basic "firsts," RCA scientists have added advance after advance, which are daily bringing television into the lives of more and more people.

How you profit

Advanced research in television tubes is just one way in which RCA Laboratories work in your interest. Then leadership in science and engineering adds *value beyond price* to any product or service of RCA and RCA Victor.

Examples of the newest advances in radio, television, and electronics—in action—may be seen at RCA Exhibition Hall, 36 West 49th Street, New York. Admission is free. Radio Corporation of America, Radio City, New York 20.



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ASTRONOMY

New Birth of Earth Theory

A pancake of gas and dust which rotated around the sun is the latest theory of the earth's origin. The moon was probably formed as partner planet to the earth.

➤ **THREE** billion years ago there was a giant cloud of gas and dust rotating around the sun. A few thousand years passed and a thin pancake was formed, a gigantic ring, in the plane of the present planets. Whirling eddies of matter appeared. These shrank and finally condensed into the planets and their satellites.

This is the latest theory of the origin of the earth and the rest of the planets, advanced by Dr. Gerard P. Kuiper, director of the Yerkes and McDonald Observatories of the Universities of Chicago and Texas.

Dr. Kuiper's new theory is a modern version of the early one put forth in 1755 by the German, Immanuel Kant. He speculated that the planets and the sun were formed from a single rotating gaseous cloud.

The mass of the planets-forming nebula around the sun in the Kuiper theory was about half that of the sun. The whirling eddies became what Dr. Kuiper calls "proto-planets", each of which went into the making of its planet and its satellites.

The ring of Saturn gives an idea of what the nebula looked like, since it is the only part that failed to condense. The reason

was that it was too close to the planet.

The compositions of the planets were determined largely by the temperatures of the regions of the cloud from which they were formed. Mercury, Venus, and Earth, close to the sun, are dense materials which became solid at fairly high temperatures. Planets far from the sun, Jupiter, Saturn, Uranus and Neptune, are gases, water, ice and hydrocarbons.

Solar tides worked on the proto-planets and rotated them in the same direction as their motion around the sun. While the satellites of the planets were forming all the planets had rings like Saturn.

But the moon of the earth is an exception, according to the Kuiper theory. It was probably formed as a double planet as a partner to the earth. The earth and the moon were formed of solid matter that hailed down in a manner conceived by the earlier Chamberlin-Moulton earth origin hypothesis. The craters on the moon date from that time, and so does the Arizona meteor crater, the others on earth having been eroded away.

Science News Letter, October 22, 1949

GENERAL SCIENCE

Nobel Peace Prize Winner

➤ **AWARD** of the Nobel Peace Prize to Lord Boyd Orr, Scottish nutrition authority, marks the second time this award has gone to a scientist.

The previous award of the Peace Prize to a scientist came in 1922 when it went to Fridtjof Nansen, Norwegian Arctic explorer. Like Lord Boyd Orr, Nansen had turned from his scientific work in the field of exploration to problems of world hunger. At the close of World War I, Nansen directed relief work for famine-stricken Russia and later continued to direct two agricultural demonstration estates in the former famine areas.

"Nansen passports" owe their name to his work with refugees.

Lord Boyd Orr turned to problems of world hunger and their effect on world peace from the more conventional approach of researcher in nutrition. At Rowett Agricultural Research Institute in Aberdeen, Scotland, he organized surveys of the place of essential minerals, such as lime, salt, iodine and iron, in the diet of animals. He and his collaborators investigated the mineral content of the pastures of Britain,

parts of Africa and elsewhere.

While in Africa, he made a study, famous in scientific nutrition circles, of two African tribes living side by side but following different methods of getting a living and consequently different diets. One tribe which tended herds lived chiefly on meat, milk and blood. The other tribe lived chiefly on cereals, tubers, green leaves and peas and beans. Members of the first tribe averaged five inches taller and 23 pounds heavier and had much greater strength than the second tribe. In the first tribe, 60% of the children under eight years rated "very good" in health and nutritional state, compared to 7% of "very goods" in the second tribe. And members of the second tribe had much more tooth decay, softer bones, and more sickness than the first.

From this experience and further study of diets of humans, who, he used to say, were much worse nourished than their animals, he turned to the broader problem of hunger and the food supply in relation to world peace.

In a Thanksgiving Day message to Ameri-

cans, he predicted that the world food shortage would not end soon (See SNL, Nov. 22, 1947).

"It will continue for many years," he declared. "But it can be overcome, provided the nations act together on a unified plan. The solutions are to be found in more production and a more equitable distribution of food, together with a general improvement in the economic life of the people of the whole world."

"Then and only then may a Thanksgiving Day for the world be proclaimed."

Science News Letter, October 22, 1949

MEDICINE

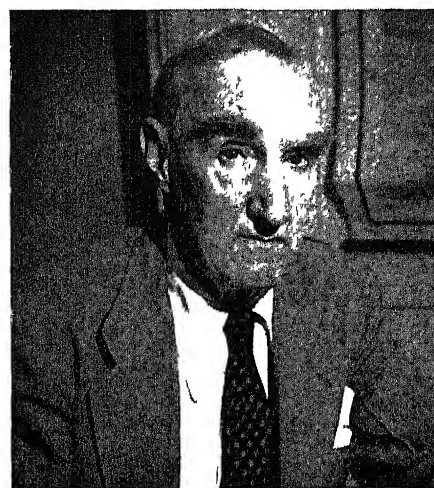
New Technique Aids Malaria Medicine Search

➤ **HOPE** of getting a better medicine against malaria, one which will attack the parasites of the disease in the early stages, is advanced through a new technique developed by Drs. I. N. Dubin, R. L. Land and V. P. Dinnon of the University of Tennessee.

These scientists have developed a method of getting malaria parasites to grow on chick embryos so that scientists will be able to watch through the microscope the development of the parasite through all the stages of its life cycle.

During part of this cycle after a mosquito bite has deposited the malaria parasite, or germ, in human blood, the parasite disappears. Finding a medicine that will reach it during this stage of its development is the next object of the Tennessee doctors' Navy-supported research.

Science News Letter, October 22, 1949



NOBEL PRIZE WINNER—Lord Boyd Orr, Scottish nutrition authority, has been awarded the Nobel Peace Prize for 1949. The second scientist to receive this award, Lord Orr has made valuable contributions to the solution of world hunger problems and their effect on world peace.

MEDICINE

Lung Cavities Healed

➤ SKIN grafts are being used successfully to heal giant cavities of the lungs of tuberculosis patients at Grace Dait Home Hospital in Montreal, Canada.

In this procedure, developed by Dr. Arthur Martin Vineberg, the cavities are treated by drainage, much as an abscess would be. Then the cavity is opened further through the drainage opening and its walls and "floor" are covered with skin grafts.

"Gradually the boundaries of the cavity are lined with skin which grows out to meet the skin on the surface of the chest wall. The cavity thus becomes obliterated, leaving a defect in the chest wall," Dr. Vineberg states in a report to the *Society for Experimental Biology and Medicine*.

The first patient to receive this new treatment was a 52-year-old man with far advanced tuberculosis of both lungs. He had giant cavities at the apex of each lung. Drainage was established on the left side, but the patient's poor general condition prevented further collapse therapy to rest the lung, the usual treatment in such cases.

Skin grafts were applied on four occasions, with a 75% take of the graft on each occasion. The cavity on the left side grew smaller and gradually was covered with skin and the bronchial openings which at first were large gradually closed.

At the time of the patient's death, three months after the last graft had been applied, there was no sign of an open bronchus. The surface skin on the chest wall showed a depression about one and one-half inches in diameter which entered into the lung. The cavity seemed to be completely covered by skin.

Dr. Vineberg bases his operation on considering a tuberculosis lung cavity as a

chronic lung abscess. There is this difference, he points out. When a lung abscess is drained, the surrounding lung tissues fill in the defect, but in a tuberculous lung the tissues are usually diseased and cannot expand to fill the space occupied by the cavity. So he uses skin grafts to do this job of obliterating the cavity.

The operation has been performed on two other cases successfully and in both the cavities seem to be healing.

Science News Letter, October 22, 1949

PHYSICS

Improved Magnetometer Is Developed

➤ AN IMPROVED magnetometer, the instrument used trailing and under an airplane to locate submerged Nazi U-boats during the war, has been developed at the Naval Ordnance Laboratory, White Oak, Md., it is revealed in *SCIENCE* (Oct. 7), official publication of the American Association for the Advancement of Science.

The instrument is described by E. O. Schonstedt and H. R. Irons, of the laboratory staff, as a modified form of the airborne magnetometer developed by the Navy and industry during the war. It continuously records geomagnetic information from which all magnetic components may be determined.

The basic feature of the new magnetometer, they state, is that it now determines the total magnetic field vector, instead of only the intensity. This is done by measuring the intensity and the direction of the total field vector with respect to a set of coordinate axes stabilized with respect to the surface of the earth.

The sensitive measuring element of the magnetometer is a saturable inductor which is excited by a current of sufficient amplitude to saturate its permalloy core. A current is generated by the inductor, the amplitude of which is proportional to the strength of the magnetic field along its axis.

Science News Letter, October 22, 1949

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What is one of the causes of the war threat to the U. S.? p. 261

PSYCHOLOGY

Cause of War Threat

Narrow ways of human behavior developed in childhood find expression through the aggressions and discriminations of our present day world.

➤ ONE of the reasons the world is threatened by global war is that both in Russia and United States people are following narrow ways of human behavior developed in their childhood.

This is the conclusion reached on the basis of animal experimentation by Dr. Edward C. Tolman, of the University of California, psychologist brother of the late Dr. Richard C. Tolman, noted for his part in developing the atom bomb.

Dr. Tolman's report to the *PSYCHOLOGICAL REVIEW* (July) was awarded an honorable mention by a committee of the American Psychological Association who selected the best psychological papers of the year.

Watching a rat learn to find its way without error from the starting point of a maze to the reward of food in the goal box, Dr. Tolman has concluded that the animal achieves this by assembling the cues coming to him through his senses and by working these over in the control room of his brain, making them into a tentative road map of his environment.

If this map is of the narrow strip-map type, it will enable the rat to find his way repeatedly to the goal, provided no changes are introduced in the maze.

But the rats, Dr. Tolman found, are able to produce a more comprehensive map with which they can adapt to changed conditions. In one series of experiments, the rats learned to find their way through an indirect pathway to the food box. Later the maze was changed so that the starting place was unchanged, but the latter part of the maze was replaced by a sunburst series of runways. It was found that the majority of the rats selected the pathway that led them nearest to the part of the room where the food was located, although by an entirely different route from that traveled previously.

The reason why the rats sometimes produce only the narrow strip-maps was explored by Dr. Tolman. They are induced by a damaged brain, by an inadequate array of environmental cues, by an overdose of repetitions on the original trained-in path and by too strong motivations or too intense frustrations.

With men as with rats, Dr. Tolman pointed out, if early learning is too strongly stamped in by excessive motivation or frustration, it is difficult to re-learn when the original path is no longer correct. And if the individual receives a shock, there is a tendency to regress to the earlier, now inappropriate pathway.

The displacement of hates and aggressions onto outsiders is also a narrowing of the road-map of life, Dr. Tolman feels, due to too great motivation or frustration.

"Over and over again," he says, "men are blinded by too violent motivations and too intense frustrations into blind and unintelligent and in the end desperately dangerous hatred of outsiders. And the expression of these displaced hates ranges all the way from discrimination against minorities to world conflagrations."

"We dare not let ourselves or others," Dr. Tolman warns, "become so over-emotional, so hungry, so ill-clad, so over-motivated that only narrow strip-maps will be developed. All of us, in Europe as well as in America, in the Orient as well as in the Occident, must be made calm enough and well-fed enough to be able to develop truly comprehensive maps."

"We must, in short, subject our children and ourselves (as the kindly experimenter would his rats) to the optimal conditions of moderate motivation and of an absence of unnecessary frustrations, whenever we

put them and ourselves before that great God-given maze which is our human world. I cannot predict whether or not we will be able, or be allowed, to do this, but I can say that, only insofar as we are able and are allowed, have we cause for hope."

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PLANT PATHOLOGY

Electron Microscope Aids Battle Against Cancer

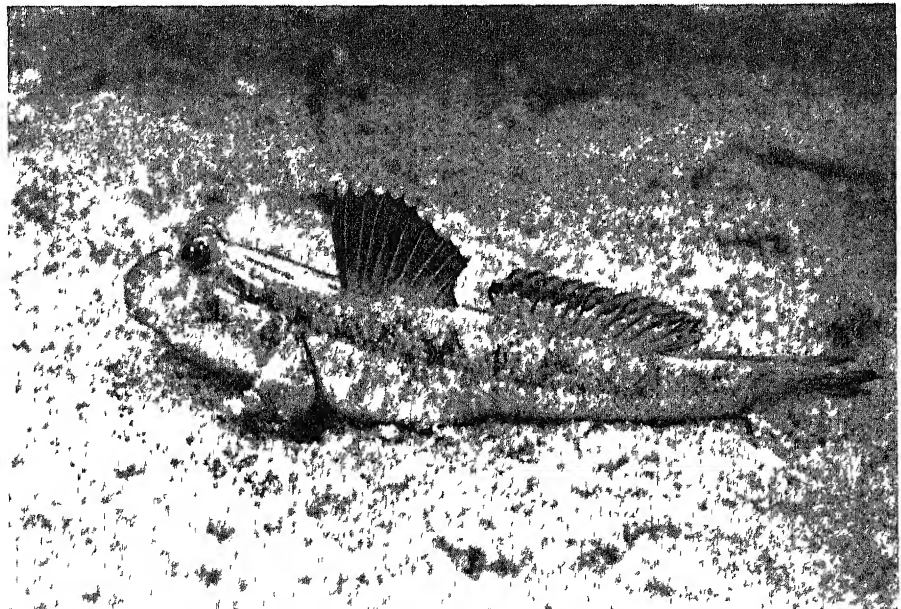
➤ AN electron microscope attack on the cancer problem at the basic level of growth in its simplest form has been made by Prof. Robley Williams and Drs. Robert C. Backus and Russell L. Steacie of the University of Michigan.

The growth curves for two plant viruses have been plotted for the first time in researches by these men. They have done this through counts of the number of virus particles seen in electron microscope pictures of the partially purified particles.

The significance of the growth curves was explained as follows.

"Now for the first time precise measurements can be made of the effects of chemical and physical agents on the growth of plant virus. We'll be able to show what things speed growth and what slows it down, and it's the latter we're most interested in."

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TROPICAL MUDSPRINGER—This strange-looking creature is a "fish out of water", and it feels perfectly at home. The mudspringer is a tropical fish of Africa, Australia and southeastern Asia, and it is so called because of the prodigious leaps it makes along the ground. It uses its strong front fins something like oars, pulling itself forward with a rowing motion. When fly-catching, or when eluding capture, it can leap and hop with great agility.

METEOROLOGY

No Weather "Cold War"

➤ SO far as the weather is concerned, the USSR is exchanging information with the United States in a most cordial and effective manner, a check-up at the U S Weather Bureau reveals. The two nations are able to talk about each other's weather four times a day and the American forecasters are getting all the information they need to help predict general U S weather of next week and view world weather almost from hour to hour.

The interchange is by radio and there are no complaints about one nation jamming the other's radio transmissions of weather information. The facts about the weather are in prearranged international code, arranged through one of the few international organizations, besides the United Nations, to which the Soviets still adhere, the International Meteorological Organization.

Actually on a good day when radio reception is satisfactory, the U S forecasters have more weather observations from Soviet points than they have from the United States. This is because the USSR covers more area.

Most useful to us are the observations from eastern Russia and Siberia because weather travels from west to east in the northern hemisphere and storms that originate there often come to Canada and the United States.

From 500 ground stations in the USSR, full reports are received every six hours when the radio conditions are good. This may drop to 200 on a day of bad radio reception. These 500 synoptic reports, as they are called, give temperature, pressure,

wind direction and velocity, humidity, whether it is clear, cloudy, rainy, etc., visibility, pressure changes, which are all standard data. Comparatively, such reports are received from 400 U S stations.

We also know what the weather is in the air over a large number of Soviet points. From 65 to 70 Soviet localities pilot balloon observations, called "pibals," for short, are received four times daily. These give wind direction and velocity usually up to 25,000 to 30,000 feet on clear days, and occasionally to 50,000 feet. The number of U S Weather Bureau stations making pibal observations is about 150.

Radiosonde flights, which consist of miniature radio sending instruments carried aloft by balloons, provide temperature, pressure and humidity data up to 50,000 feet altitudes from 35 Soviet points each weather radio transmission. The coverage of the U S A. by such rayobs or rawin sondes, as they are also called, requires more than 50 such observations.

The Russian weather messages are usually copied at present in Tokyo and Germany, although they could be received directly in the United States if that seemed advisable, instead of having them relayed from overseas. Both American and Soviet weather messages are included in the international weather transmissions that anyone can pick up and decode and use. Most of the larger nations contribute to the world weather forecasting by issuing such information by regular radio transmissions.

Science News Letter, October 22, 1949

GENERAL SCIENCE

Strong Military Defense

➤ OVERLOOKED in the excitement of the Soviet atomic explosion is a strengthening of the military arm of the United States that promises to have far-reaching effects.

The Research and Development Board of the Department of Defense has been given more authority and responsibility. It can now see that what it believes should be done in weapon development is actually carried out. It has been moved from the situation of being advisory and getting results by knocking military heads together to one of being able to order things done.

Despite the effectiveness of the predecessor organization of World War II, the famous OSRD, the Office of Scientific Research and Development, headed by Dr. Vannevar Bush, the complaint of the key scientists in that organization was that it took too long to get the new discoveries and developments of the scientists into actual operation.

This was not a real criticism of the military men, for in general they realized the need of new methods to counter and surpass the enemy's technology. But it was necessary to go through another layer or echelon of command to get things moving that took precious and sometimes deadly time.

Now Dr. Karl T. Compton, chairman of the RDB, who was one of the Bush group, heads an organization that has the burden and opportunity of decision as well as development. In the new RDB set-up, there is now either an undersecretary or an assistant secretary of the Army, Navy and Air Force, as well as high-ranking officers. Thus there is a fusion of civilian and military command to help put scientific brainpower to work.

Just what the RDB is doing is largely secret. But experts come and go within the far-flung program. We can now expect that the direction of the search for

better offense and defense will be shifted more rapidly than ever before, even if we can not hear about such changes.

For science, there is almost a feeling of active war in the air, with scientists saying less than ever they have since V-J day and fewer and fewer publications appearing in certain fields of development.

Science News Letter, October 22, 1949

On This Week's Cover

Greater stockpiles of blood, for use in event of an atomic war or other national disaster, may come through new methods being developed for the National Blood Program of the American Red Cross. On the cover: Dr. John G. Gibson of Harvard Medical School and Charles P. Emerson of Boston University are shown inspecting a new silicone-coated blood collecting bottle in which the separation of red cells from plasma is speedily accomplished through the use of a blood substance, fibrinogen. (See SNL, April 30, p. 275 and May 14, pp. 314, 315.)

Science News Letter, October 22, 1949

PSYCHOLOGY

Answer to "Who Are You?" Varies with Age and Sex

➤ ASK a person "who are you?" and you'll get a wide variety of answers. Give those answers to a psychologist and he may find them psychologically significant.

So say Dr. James F. T. Bugental and Seymour Zelen, psychologists at the University of California at Los Angeles, who have asked this question of several hundred students, church members, white collar workers and laborers.

Those tested were asked to write three responses to the question. An analysis revealed that more than 18% considered themselves to be, first of all, a name such as "Joe" or "Bill." Slightly less than 18% replied with their occupational status, that is, student, riveter. The same percentage fell into the sex category, such as "I am a boy, a girl, a woman, a male."

One female very conscious of her femininity replied, "a female, a coed, a sister." Others identified themselves as a "unique person," "getting a kick out of life," "some joker."

Group patterns were evident in the over-all analysis. For example, older men seemed to favor occupational status, whereas, mature women favored family status. Younger subjects responded more often with sex identification and the youngest females seemed to favor social status.

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Mexican tortillas, pancakes made of corn meal, have higher nutritive value if made of a mixture containing one-tenth sesame meal.

ELECTRONICS

New Television Receiver

A new television receiver which will pick up the color broadcasting of all proposed systems has been revealed. It also reduces flicker problems.

➤ A NEW color television receiver, just revealed, will be able to pick up pictures, in either color or in black-and-white, of any of the color broadcasting systems now proposed. It will be able, also, to receive the present black-and-white broadcasting programs.

Details of this new receiver have been presented at the present hearings of the Federal Communications Commission in Washington, D. C. The commission is trying among other matters to determine if color broadcasting has reached a sufficiently developed stage to warrant the issuing of broadcasting licenses.

This new color receiver was developed by Dr. C. Willard Geer of the University of Southern California, Los Angeles. It can be manufactured to retail at a price approximately the same as present black-and-white television receivers. Also, it is not a bulky piece of apparatus, making it quite suitable for use in the ordinary home.

In addition, the color device of this receiver can be used as a color adapter to be placed on present black-and-white receivers as an auxiliary unit, or inside the set as a replacement at modest cost with a sufficient simplicity so that renovation can be accomplished by a competent television serviceman.

The color television tube which Dr. Geer has developed provides a receiving set which is all-electronic, direct-viewing, with no filters, no moving parts, no projection lenses, and no external apparatus requirements. For large screen or theater television it would lend itself to any projection system. Because it is direct-viewing and all-electronic, and utilizes no filters, its available amount of light is maximum and flicker problems are reduced to a minimum.

The simplest conception of how the tube operates may be obtained, Dr. Geer states, by likening it to the present three-color photographic process, in that three separate pictures (the green, the red, the blue) are painted upon the screen of the tube by three electron guns either all at the same time or in extremely rapid succession. With the light shining through, they are superimposed upon one another and give the effect of a complete natural color scene.

Two types of tubes were designed by Dr. Geer, the second of which is preferable. It has three electron guns placed upon the back of the tube at angles approximately 45 degrees each way from the perpendicular to the screen. The screen itself is made up of tiny pyramids which rise above the surface of the screen and in a concave

manner go below the plane of the screen. All the surfaces of these pyramids facing toward one particular gun are phosphored with a particular primary color, and paint a complete picture in that color.

These pictures will all be painted at the same time, or in rapid sequence, producing a complete tri-color picture. On the same screen, merely by turning a switch so that all guns will receive the same signal, black-and-white may be received. The red gun will paint the black-and-white signal in red, the green in green, and the blue in blue. But these will add up to a black-and-white picture.

Science News Letter, October 22, 1949

CONSERVATION

Larger Lobsters Should Be Thrown Back

➤ "THROW it back, it's too big." This cry, reversing the usual watchword among fishermen, may soon be raised by Bermuda lobstermen, as a result of a preliminary study just completed.

The study shows that the larger lobsters have a much greater reproductive capacity than the smaller. A 15-inch female lays 2,500,000 eggs at a time, against a fourth that many for a 10-inch. Under present controls, all lobsters over four inches in body length may be taken. This results in a high percentage of captures of the prolific larger females.

Dr. E. P. Creaser, biologist at Hofstra College in Hempstead, N. Y., has just returned from the first year of a three-year study of the living habits of lobsters. He points out that before new legal limits are set, forbidding the taking of large lobsters, further investigation will be necessary. Dr. Creaser also recommends the construction of rock islands as experimental lobster shelters.

Science News Letter, October 22, 1949

PSYCHOLOGY

"One and Only," "Lucky In Love" Are Myths

➤ THE "One and Only Love" is a myth.

So declares Dr. Claude C. Bowman, sociologist of Temple University.

Another romantic myth, he says, is that a person is either lucky or unlucky in love.

The tendency of men and women to think of themselves as passive "pawns" control-

led by mysterious forces called "luck," is due, Dr. Bowman believes, to prevailing ignorance of the processes of "falling in love."

It will probably be several decades before such knowledge is available, he predicts. The biological findings of Alfred Kinsey and his associates are only a beginning, he indicates.

But the studies of sex relations already available, although meager, tend to explode the romantic illusion that there is a single "soul mate" to whom one is attracted by a cosmic affinity that is powerful and not to be denied.

"It seems clear," reports Dr. Bowman to the AMERICAN SOCIOLOGICAL REVIEW (Oct.), "that heterosexual affections do not necessarily run in single channels. Often there are multiple attachments and a marital choice is made with the greatest difficulty. Even after marriage, though the union is supported by legal and moral sanctions, the monogamous attachment may be weakened by extra-marital attractions."

But people go on thinking that in these unhappy cases, the men and women have not been fortunate enough to find their real "soul mate" and divorce courts are filled with people hoping for "better luck" next time in finding the ideal mate.

Actually, he says, among both sexes there must be a significant proportion who chafe under the necessity of concentrating all heterosexual interest upon a single person.

Science News Letter, October 22, 1949



NEW WELDING GUN—Welding aluminum plate is made easy with this gun which has no rods to change, and the worker "lays his bead" without interruption. The filler metal is fed to the gun automatically from the spool at the right. This process will increase the use of aluminum plate in industrial fabrication.

OPHTHALMOLOGY

Radioactive Chemical Treats Eye Tumors

➤ A RADIOACTIVE chemical from the atomic pile is now being used instead of radium or the related radon for treatment of certain eye conditions, three Cleveland, Ohio, scientists announced at the meeting of the American Roentgen Ray Society in Cincinnati, Ohio. The scientists are Dr. Hymer L. Friedell, Dr. Charles I. Thomas and Jack S. Krohmer.

The chemical, radioactive strontium, is put into a lucite capsule which completely encloses it and this capsule is then deposited in an aluminum applicator. This is used in direct contact in treatment of such eye ailments as superficial tumors, or growths, corneal ulcers and the inflammatory condition, conjunctivitis.

It is the beta rays from the radioactive strontium that are effective in treating these conditions, the Cleveland group explained. Their short range is particularly useful because deeper tissues such as the eye lens are not reached and therefore not damaged.

Radium and radon emit beta rays but they also emit the more deeply penetrating gamma rays which must constantly be guarded against in treatment of eye conditions. The lack of gamma rays constitutes one advantage of the radioactive strontium.

Science News Letter, October 22, 1949

DENDROLOGY

Revival of Chestnut Is Now Possible

➤ A REVIVAL of home-grown chestnuts may soon restore the all-American quality of Thanksgiving that it lost when the native tree was wiped out by the chestnut blight. The traditional roast turkey, now stuffed with Italian or Spanish chestnuts, may once more bulge with domestic ingredients.

This will be possible because three new chestnut varieties have been developed which produce a great quantity of large sweet nuts. The new nuts are larger, sweeter and less grainy than those now seen at the market. U. S. Department of Agriculture scientists who developed the trees say they are highly productive and, even more important, resistant to chestnut blight.

Graft trees of the new varieties, which are called Naking, Meiling, and Kuling, are now available through tree nurseries. If they live up to expectations, they will make us independent of foreign sources. The trees reach such high yields, over 100 pounds per tree, more than a ton per acre, that government experts foresee their widespread use as an orchard crop. They advise growers, however, to start out small, because the public will have to develop a taste for the nuts before they can be marketed in any quantity. They point out that

it has been some years since chestnuts were a commonplace household item.

The new trees, developed under the direction of Dr. H. L. Cline of the Beltsville, Md., Research Center, are the culmination of nearly 40 years of research. In 1915 and earlier, chestnut trees were imported from China in order to develop a high nut-producing variety. The American chestnut was primarily a timber tree. Its nut production was relatively small and was considered of secondary importance.

The only result of these early experiments was to introduce the chestnut blight. The blight is native to the Orient and oriental trees had developed a resistance to it. The blight was unknown in the United States before then. It spread with remarkable rapidity throughout the stands of American chestnut and wiped them out.

The new trees, the best of some 400 types tested, flourish in the southeastern United States where trial plantings have been made. Dr. John W. McKay is conducting further tests at Beltsville to determine their suitability to northern and central states.

Science News Letter, October 22, 1949

ENGINEERING

Molten Zirconium Provides Very Brilliant Light

➤ A POOL of molten zirconium at a temperature of near 6,500 degrees Fahrenheit provides the light in a new lamp which has a brilliancy one-eighth that of the sun, it was revealed at the meeting of the Society of Motion Picture Engineers in Hollywood, Calif., by W. D. Buckingham of the Western Union Telegraph Company.

The particular applications for which this new light is suitable are in the fields of projection, television, photography, lithography and photo-copying. It will also have wide medical and scientific uses, and will be of especial importance in color photography.

It was described as a high-power, high-intensity electric arc light whose luminescent source is two-tenths of an inch in diameter. It operates in the open air and not in a glass bulb. It is said to be extremely stable in operation, producing a uniformly bright, sharply defined circular spot of white light of dazzling brightness. In a 1000-watt lamp, operating at 55 volts and 18 amperes alternating current, the light has 20 times the brightness of the ordinary tungsten filament lamp.

In spite of operating in the open air and at this extremely high temperature, the lamp can be made to have a life of several hundred hours, Mr. Buckingham explained. This is due to a unique operating principle whereby the zirconium metal is constantly renewed and reproduced from its own products of combustion. The electrodes are small and can be easily replaced. The new lamps may operate on either alternating or direct current.

Science News Letter, October 22, 1949



MEDICINE

Folic Acid Is More Deadly to the Female

➤ A CHEMICAL that is more deadly to the female than to the male has been discovered. The chemical is one of the newer vitamins, folic acid, or pteroylglutamic acid as it is called in chemical circles.

"Male mice easily tolerate amounts of this material lethal to every female injected," Drs. Alfred Taylor and Nell Caimichael of the University of Texas and the Clayton Foundation, Austin, Tex., reported to the Society for Experimental Biology and Medicine.

It was large doses, not the ordinary sized ones, that showed this sex selective lethal action.

"Why the female should be so much more susceptible than the male to high dosage of folic acid has not been determined," the scientists stated.

"So far as could be discovered, no other compound has ever been reported which manifests such a sex difference in its pharmacology (drug action)."

Smaller doses, which did not kill the females, nevertheless affected them more than the males. They averaged a 10% loss in body weight, followed by slow recovery, after a single injection of a dose that only slowed slightly but did not stop continued weight gains in young males.

More than 400 pure bred mice were used in the experiments.

Science News Letter, October 22, 1949

ENTOMOLOGY

New Automatic Sprays Banish Pests from Planes

➤ DANGEROUS, disease-carrying insects and agricultural pests on overseas transport planes can now be banished automatically by a flick of the pilot's finger.

The insecticide spray system, developed by the Navy in cooperation with the U. S. Public Health Service and the Department of Agriculture, will prevent undetected insects, such as the Hawaiian fruit fly or the oriental peach moth, from being flown into the United States.

Interiors of planes so equipped are sprayed before passengers are allowed aboard. After the passengers are seated, the pilot then gives the plane another, lighter dose sufficient to kill insects that might have flown into the plane during loading.

Use of the automatic system eliminates any possibility of missing certain recesses of the plane, such as the wheel wells, as might happen when spraying is done by hand.

Science News Letter, October 22, 1949

E FIELDS

OPTICS

Supermicroscope Uses Mirrors Instead of Lenses

➤ SUPERMICROSCOPES that use mirrors instead of lenses to peep into the chemistry of cancer and other living tissues will soon be available to American scientists who have heretofore known them only through reports from English and Dutch scientists.

Because these new microscopes use mirrors instead of lenses, scientists can use them with both visible light to see the cancer or other tissues and with the invisible light of infra-red rays to identify chemical compounds in the material being seen through the microscope. They may also be used with ultraviolet light.

Reflecting microscopes developed abroad use aspherical mirrors which must be polished and corrected by hand, a costly and time-consuming process. Now a new system, using spherical mirrors which can be made by standard machine methods, has been developed by Arthur J. Kavanagh, research physicist at the American Optical Company's Stamford, Conn., research laboratory.

Plans to manufacture the new optical parts for use on any standard microscope stand are now being made at the company's instrument division in Buffalo, N. Y. Alva H. Bennett, director of the company's research laboratories, announced at the meeting of the Electron Microscope Society of America in Washington, D. C.

Scientists at the U. S. Bureau of Standards where the meeting was held were also informed that another manufacturer of optical equipment, Bausch and Lomb, has developed a reflecting type objective for use in ultraviolet light.

Science News Letter, October 22, 1949

PSYCHOLOGY

One-Arm Driver Has Unsteady Hand on Wheel

➤ THE one-arm driver does not have even one steady hand on the wheel, even if the other arm is not around a girl.

This is indicated by experiments conducted by Dr. Austin S. Edwards, of the University of Georgia, who tested the effect of this and other distractions on the involuntary movements in the arm and hand.

Using a mock-up auto steering wheel attached to scientific instruments that would measure unsteadiness in the arm and hand, Dr. Edwards found that if the individual keeps his attention fixed, looking steadily at a point about six feet in

front of him, bright headlights flashed in his eyes or auto horn blasts sounded near him do not disturb him enough to make an appreciable change in the steadiness of his hands.

But if someone distracts the "driver's" attention to hand him a pencil, it disturbs him so that the involuntary movement in his hand goes up 4.46 times if it is a man, 4.91 times if it is a woman (the driver, that is).

Asking him to look out the window increased the involuntary movement as much as 65%. Distracting his attention to look out the window when he had only one hand on the wheel was even more disturbing, causing a 304% increase in the trembling.

The psychologist does not report whether he measured the disturbance caused when the driver's arm is around the girl friend.

Dr. Edwards believes that his results are less than the disturbance of hand steadiness would be on the road.

"If so great an increase of involuntary movement takes place in the relative quiet of the laboratory, how much is to be found under the disturbing conditions of actual automobile driving?" he asks.

Results of the study are reported in the *JOURNAL OF APPLIED PSYCHOLOGY*, published in Washington, D. C.

Science News Letter, October 22, 1949

DENTISTRY

Dentists May Soon Use New Metals

➤ USE of new metals for manufacture of false teeth, dental inlays and other dental material is foreseen by Dr. Joseph R. Lane of the Massachusetts Institute of Technology.

Tantalum, light weight metal which surgeons use to replace pieces of skull bone and in other ways, is one metal which Dr. Lane suggests might be useful also in dentistry.

Titanium, only recently available in quantity, a strong metal as corrosion-resistant as the stainless steels, is another which he thinks should be explored for possible dental uses.

The conventional gold and amalgam alloys now used in dentistry probably will be "steadily, though slowly, improved," he predicts in a report to the *JOURNAL OF THE AMERICAN DENTAL ASSOCIATION* (Oct.).

"With the alloys now at hand it would be entirely possible to produce dentures of considerably improved properties," he declares.

If dentists demanded stronger, more ductile dentures with more consistent and reproducible properties, they could, he says, be produced "with the knowledge now at hand and without a prohibitive increase in cost."

Science News Letter, October 22, 1949

PALEONTOLOGY

Bones of Birds Which Could Swim Are Found

➤ A JIG-SAW puzzle of fossil bird bones has been put together by Dr. Loye Holmes Miller, professor of zoology, emeritus, at the University of California at Los Angeles, to reveal the existence of a small, penguin-like bird that existed in southern California more than 3,000,000 years ago.

At that time most of the city of Los Angeles was under water and the flightless fowl, called *Mancalla*, paddled around with flippers which, in previous ages, might have been wings.

First evidence of the bird's existence was discovered 50 years ago when a single bone was dug up during the excavation for the Third Street tunnel in downtown Los Angeles.

Since then a number of fossil remains have been unearthed at various places in southern California. Sufficient remains now exist to furnish a rather accurate picture of the *Mancalla*, states the U. C. L. A. scientist.

The bird is biologically significant, he points out, because it is a good example of the way nature adapts her creatures to the situation at hand, in this case, for aquatics rather than flight.

Why did the *Mancalla*, members of the auk family, become extinct? At present the reason is not known, says Dr. Miller. Far to the south, birds of similar qualities, members of the albatross tribe, managed to survive. We know them as penguins.

Science News Letter, October 22, 1949

RADIO

Unstable Radio Reception Broadcasts To Begin

➤ UNSTABLE radio reception conditions, as well as normal and disturbed conditions, will be broadcast by the National Bureau of Standards in Washington, D. C., starting Nov. 1.

Station WWV, the Bureau's radio station that tells of the conditions in the atmosphere at 19 and 49 minutes past each hour, is adding this new service to warn operators that unstable conditions exist.

Previously only two radio reception conditions have been broadcast, the letter "N" in International Morse Code indicating normal conditions and the letter "W" warning that disturbed conditions are present or expected within 12 hours. Station WWV also broadcasts the standard musical pitch, time announcements and standard radio frequencies.

Unstable radio reception often occurs as major disturbances subside. Mobile services such as airplanes on transatlantic flights particularly and shortwave broadcasts experience difficulty at that time.

Science News Letter, October 22, 1949

ENGINEERING

Solutions to Air Pollution

Non-smoking factory stacks from overfire air jets, proper firing and new smokeless home heaters aid in the smoke abatement program.

By A. C. MONAHAN

➤ WITH winter ahead, smoke pollution of the atmosphere will greatly increase. The millions of coal furnaces in private homes will be partly responsible, and to their smoke will be added that from millions of heaters used in other types of buildings. Improperly adjusted oil and gas burners will also help.

Smoke alone is not the only air-polluter. However, it is the visible pollution and it is largely unnecessary. Fumes from industrial processes are often far more dangerous.

Elimination of fumes is a matter for owners and public authorities, but the authorities need public backing and perhaps public pushing. Smoke pollution from private furnaces can be controlled by the home-owner himself.

Cars Pollute the Air

Nature combines with man in polluting the atmosphere. Pure air is found only in places free from nature's pollution such as over certain mountain ranges and far out over the ocean. Dust is the ordinary pollutant, but the dust, in addition to tiny particles of earth, may contain germs, plant pollen and vegetation. Wind is responsible for the dust in the air, and also for the many miles that dust often travels.

Ordinarily of more importance is the air pollution from industrial activities that discharge invisible gases, fumes and chemicals into the air. Also important are the exhaust gases, including poisonous carbon monoxide, discharged by the millions of motor vehicles on American streets and those coming from the now widely used diesel engines. Atmospheric pollution from these sources presents one of the most difficult problems in the "pure air" program.

Smoke Abatement

Active steps have been long underway in industrial cities to abate the smoke and the accompanying fly ash nuisance. Some 50 American towns had anti-smoke regulations 25 years ago, and similar regulations had been enacted in many European industrial cities. Today, most American cities have antismoke regulations. Methods of smoke abatement are well established. But getting rid of the smoke and fly ash is

only part of the job. The abatement of the invisible gases and fumes, which sometimes include active poisons, from factories, automobiles and incinerators is a problem yet far from solved.

"Smog" is defined in recent dictionaries, in which the relatively new word has found a place, as a combination of smoke and fog, particularly apt to occur in smoky cities. However, it may be with Pittsburgh smog, Los Angeles smog can not be blamed on coal smoke because oil and natural gas are the principal fuels of southern California.

Los Angeles is reported to have some 10 to 20 days out of the year with smog so irritating that people's eyes and nostrils smart with it. Dust, industrial fumes and irritants resulting from the incomplete combustion of hydrocarbon fuels are thought to be to blame. The geographic position of the city seems to aid the collection of the smog in the urban area. It is a city ringed with mountains except on the ocean side. The smog appears on the days when normal winds do not drive the haziness away.

"Smokeless" Stacks

Earliest attention in the American smoke abatement problem was directed naturally toward the belching factory chimneys and equally obnoxious coal-burning steam locomotive stacks. Both are in year-round operation. They emit little more smoke in the winter months than during the summer. Scientists got busy on the problem years ago and reasonably successful methods for the abatement of their smoke have been worked out.

For the most part, industry cooperated with public officials in the smoke abatement program. Now the nuisance from these sources is approaching elimination. Underfeed stoker equipment and overfire air jets have been found to be effective methods for smoke abatement because they strike at the heart of the problem.

How they work is best understood with a knowledge of the generally accepted theory on the formation of smoke. Hydrocarbon vapors, when heated to high temperatures without enough oxygen to cause complete combustion, decompose to form finely divided carbon particles or soot. These are difficult to burn, hence, the

fundamental principle of smoke abatement is not to burn smoke after it is formed, but to prevent its formation.

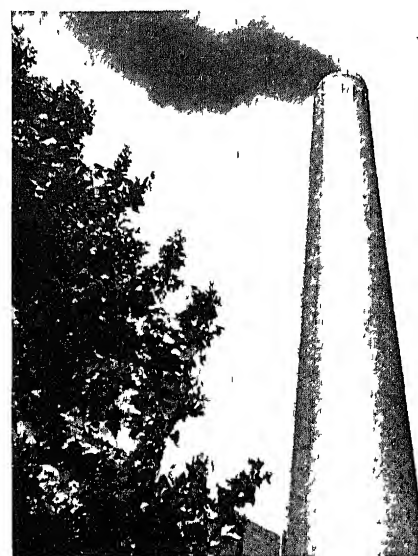
Overfire Air Jets

Overfire air jets accomplish this by forcing air into the furnace where it is needed and mixing it with unburned gases. If an excess of air is already present, the jets mix this air with the combustibles.

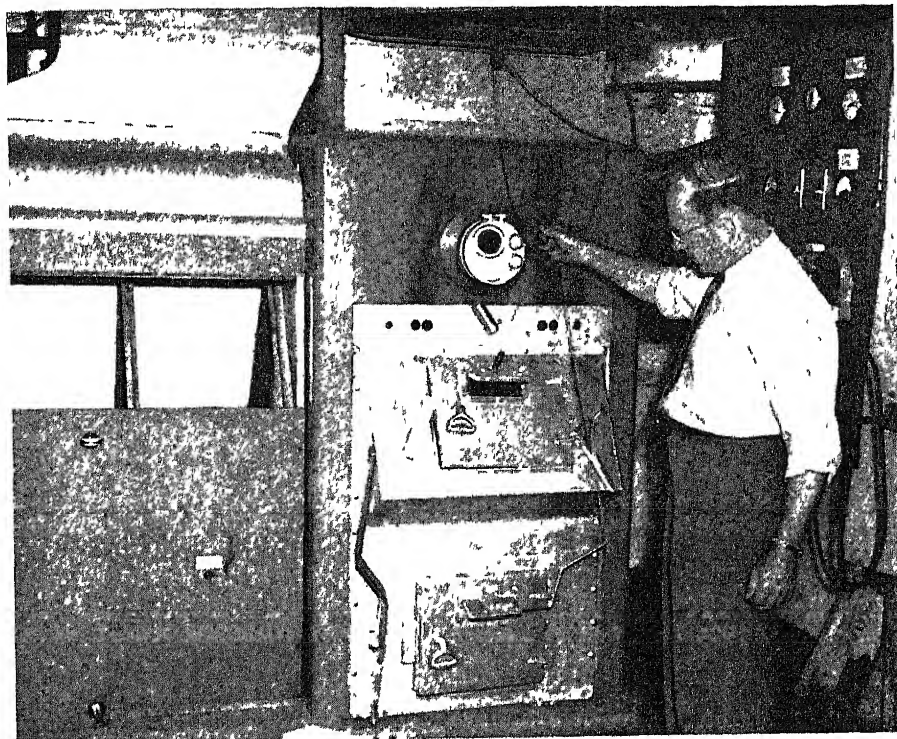
Tests have shown that, where there are no unburned-gas losses, but smoking is chronic, smoke is effectively eliminated with no change in boiler efficiency by the injection of overfire air accompanied by a compensating reduction in primary air supply to maintain constant excess air, according to a bulletin of Battelle Memorial Institute, Columbus, Ohio, where much study to the smoke abatement problem has been given.

Filtering, blowing and electrical means have all proved successful in smoke abatement from factory stacks. The filter, placed within the chimney, is a porous material that will not burn, such as steel wool, and it is capable of catching the fine particles in the smoke.

One blowing method uses the principle of centrifugal force in a whirling column of air to force the particles to the inside walls of the chimney for later cleaning. The electrical method gives the rising particles a static electric charge so that



BELCHING CHIMNEY — These factory chimneys which added greatly to air pollution are no longer necessary with the scientific smoke abatement methods now available.



SMOKELESS FURNACE—A smokeless household furnace of the University of Illinois, being inspected by Prof. J. R. Fellows, its inventor, has a coal-coking chamber in its front.

they are attracted to electric plates on the sidewalls

Proper Firing

The principal part that home-owners can play in the smoke abatement program is in furnace firing. The handling of a home furnace requires skill. It pays to acquire the necessary skill. Proper firing not only eliminates smoke but it contributes heavily in fuel-bill savings.

Clean flues and properly operating checks, and dampers are, of course, essential. Proper firing has to do with regulation of the furnace drafts and with the method that the coal is placed on the firebed. Bituminous coal contains considerable volatile combustible matters which are wasted up the chimney if not consumed in the furnace.

Spreading the coal over the entire bed of burning matter releases these volatiles, and releases also great quantities of smoke. Good firemen stack the bituminous coal in a cone in the center, or in a sloping heap on one side. Combustion then takes place at the foot of the slope, and little smoke results.

No matter how much the amateur or professional fireman may think he knows about the best methods of firing and operating a furnace, he should read the recommendations of experts which they base on scientific experimental work. Such recom-

mendations are available without cost from the U. S. Bureau of Mines, several state universities and technical schools, and particularly from Bituminous Coal Institute, Washington, D. C.

Smokeless Furnaces

Old-style bituminous furnaces will necessarily be in use for many years, but in time they will be replaced with smokeless home-heaters recently developed. Among agencies responsible for these new-type furnaces are Bituminous Coal Research, Inc., Pittsburgh, Battelle Memorial Institute, Columbus, Ohio, and the Engineering Experiment Station of the University of Illinois at Urbana. Work in the latter two is under joint sponsorship of Bituminous Research and a group of stove manufacturers.

The so-called Illinois smokeless furnace shows the trend in development. In it, each charge of fresh coal is converted to coke in a coking chamber at the front of the furnace. Coking heat comes from the coke-burning chamber in the rear. The volatile matter released as a gas from the fresh coal in the coking process mixes with secondary air introduced through vertical air passages adjacent to the combustion flue. The mixture then passes over live coals in the coke-burning chamber, where it is ignited. The result is "no smoke."

Science News Letter, October 22, 1949

ANATOMY

Fetal Heart Is Simple, Grows to Complex Organ

➤ WHEN the heart starts out in the beginning of a new life, it is a very simple sort of pump and not the complex organ that it is when the animal gets to the point of starting life on its own, Dr. Bradley M. Patten, anatomy professor of the University of Michigan School of Medicine, explained in his first national Sigma Xi lecture at the University of Illinois in Urbana, Ill.

The first heart beat does not occur in a miniature of the chambered and efficiently valved adult heart, Dr. Patten explained. In the egg cell there are very simple structures that develop into a temporary cardiac pump that starts the circulation going and keeps it in operation during the time the most elaborate heart mechanism is being formed.

The young heart cannot cease operations "for alterations", Dr. Patten explained. All the time it is changing from the simple tubular structure which first sets the blood in motion, until it becomes its chambered and valved final form, the circulation can never be allowed to cease, even momentarily.

Although most of Dr. Patten's work has been done on the chick, studies show that there are similar stages in the human and other mammal hearts, and that the stages in the formation of the blood corpuscles and the beginning of circulation are similar.

Science News Letter, October 22, 1949

PHYSICS

Stay Away from Bats If Noises Irritate You

➤ IF THE sound of fingernails scratched on a blackboard or the squeak of a street car as it goes around a corner is annoying to you, don't go near bats.

Prof. W. H. Pielemeier of Pennsylvania State College, has found that the cry of a bat four inches from its mouth is 104 to 110 decibels in the 13 to 14 kilocycle sound band. This is about equivalent to the nerve-irritating noises of a fingernail on a blackboard or a trolley squeak.

Normal speech is about 60 to 70 decibels, and a jump of 40 decibels to 100 means an increase of 100 times in the intensity of the sound.

The bat's loud warning cry can be heard at a distance of 12 feet or more.

When several bats are flying near each other and are using their sonar system, a natural detecting system similar to sonar or to radar, they are not confused by each other. Possibly each one knows his own voice by its ultrasonic spectrum, Prof. Pielemeier concludes in his report to the Acoustical Society of America.

Science News Letter, October 22, 1949

PSYCHOLOGY

Potential Suicides Spotted

➤ MANY lives may be saved by the discovery that a widely-used personality test can be used to reveal suicidal tendencies before an actual attempt is made to destroy life

The potential suicide is likely to evade direct questions about his suicidal intentions, Dr. Werner Simon and William M. Hales, of Veterans Administration Hospital, St. Cloud, Minn., state in reporting their finding to the *AMERICAN JOURNAL OF PSYCHIATRY* (Sept.) Less than one sixth of patients with suicidal tendencies said "no" when asked whether they usually feel that life is worth while

They are, however, spotted by their "yes" answers to such indirect questions as the following

I wish I could be as happy as others seem to be

Criticism or scolding hurts me terribly

I certainly feel useless at times.
I seldom worry about my health
I am easily awakened by noise
I work under a great deal of tension
My hardest battles are with myself
I frequently find myself worrying about something

I have periods of such great restlessness that I cannot sit long in a chair

I have several times given up doing a thing because I thought too little of my ability

Because this test, known to professional people as the Minnesota Multiphasic Personality Inventory, is so widely used by psychiatrists, psychologists, social workers, vocational counselors and personnel workers, the investigators feel that previously unsuspected suicidal risks may be picked up in this manner

Science News Letter, October 22, 1949

MEDICINE

New Radiation Hazard

➤ A NEW radiation hazard has been discovered accidentally by atomic energy project workers at the University of California Medical School in Los Angeles, Calif

Scientists using electron microscopes to get more knowledge for fighting disease may be getting dangerously large doses of radiation, the California scientists found. A person working a full day at the instrument they studied would get several hundred times the biggest dose considered safe

A portion of the electron beam of the microscope strikes various metal parts of the instrument, generating continuous X-rays. The operator of the microscope may be exposed to this X-radiation through the various viewing apertures

Discovery of the danger was made by Drs. Louis B. Silverman, Sylvia B. Elliott and M. A. Greenfield in the course of a

general radiation survey of the atomic energy project at the medical school here. Their detection instruments showed radiation well above background levels in the vicinity of the 50 kilovolt electron microscope. Further checking showed that the dosage of X-rays at the intermediate viewing port was 70 milliroentgens per hour, whereas the maximum radiation exposure permitted at the medical school's atomic energy project is only 50 milliroentgens per day

When a one-quarter inch thick lead plug was placed in each viewing port, X-ray dosage from the ports was reduced to less than one milliroentgen per hour.

"The high dosage had been due," the scientists report in the journal, *SCIENCE* (Oct. 7), "to the accidental use of ordinary glass instead of lead glass in the assembly of this instrument by the manufacturer"

"It is suggested," they warn, "that electron microscopists survey the radiation from viewing ports to determine whether or not the X-ray intensity exceeds the accepted tolerance dosage"

Science News Letter, October 22, 1949

PSYCHOLOGY-ANTHROPOLOGY

Faulty Sex Relations Stem From Bottle Feeding Baby

➤ THE modern mother who gives her baby a lifeless, sexless bottle to suck instead of taking him to her own breast is laying the foundations for his later faulty sex relations in marriage

This is pointed out by Dr. Margaret

Mead, anthropologist of the American Museum of Natural History in a new book, *MALF AND FEMALE (Morrow)*

What the baby learns when his body is first laid against that of his mother is the physical forerunner of the sex relationship. The mother who "puts her baby on the bottle" is substituting a relationship between the child and an object, Dr. Mead points out

We do not know, she says, at just what age the baby can distinguish the difference between a glass bottle with a rubber nipple, loose in space, from the breast which is part of the mother. But the mother knows the difference from the start and she makes it known to the child in her voice, in her hands, in the very tempo of her being. She is not giving the child herself, she is faithfully, efficiently providing the child with a bottle—an object

Thus it is not surprising when the baby grows to manhood and thinks of his relationships with his wife in terms of automobiles, fur coats, or other gifts of lifeless objects.

Bottle-fed babies, both boys and girls, learn at the beginning of life that mother is there to put things into their mouths—bottles, spoons, crackers, teethers. Deep in the picture of the relationships between men and women comes this image of original satisfaction through having impersonal things put into the mouth

"Later," writes Dr. Mead, "when the American soldier goes abroad, puzzled foreigners speculating on American morale will decide it is orange-juice or Coca-Cola or some other familiar item of American food or drink that is basically important"

Science News Letter, October 22, 1949

Words in Science— MYOPIA-HYPEROPIA

➤ THE defects in eyesight commonly known as nearsightedness and farsightedness are given names of Greek origin by your oculist

Myopia is nearsightedness or shortsightedness. You say the word my-o-pea-ah with the accent on the o. It is due to too great refractive power of the lens of the eye so that rays from an object come to a focus before they reach the retina

In hyperopia—pronounced high-pe-o-pea-ah, stressing the o—the opposite condition exists so that the rays do not come to a focus by the time they reach the retina. This causes farsightedness

Presbyopia, from Greek words which mean "old eyes," is a lack of accommodation from loss of elasticity of the lens, making it impossible to focus on objects close to the eyes. This affects people beyond the age of about forty

Science News Letter, October 22, 1949

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"Since I'm a senior in high school this year, I plan to enter the Science Talent Search It gives me great pleasure to inform you that I have found *no better magazine* for reviewing the events of modern science than SCIENCE NEWS LETTER. My only regret is that I did not subscribe to it sooner than I did" JOHN KAUFMAN, Grinnell, Iowa.

"I take this opportunity to tell you that I am enjoying SCIENCE NEWS LETTER very much It is a *clear, concise, and comprehensive digest* of current science I find it very helpful in my science work." SISTER LORETTO THOMAS, St Joseph High School, Pittsfield, Massachusetts

"Our Superintendent and the Principal of our school thought SCIENCE NEWS LETTER so fine and valuable to the Science department that *they have paid for three subscriptions* to our school, one for each of the science teachers. I have a copy in my room each week and could not do without it. Many of my seventh grade students also read the paper. It is valuable for keeping me abreast of the times in science" NETTIE M WISMER, Lawrence, Kansas

"The kids (ages 6-10-11) *go for it each week—swell.*" LT. COMDR H SEIELSTAD, U S Coast Guard, Cleveland, Ohio.

"I teach General Science in the Junior Part of the School, and naturally have to keep up to date in order to answer all the questions the children are so anxious to ask It is hardly necessary for me to say *how welcome the postman is, when he brings another issue of SCIENCE NEWS LETTER!*" J. KENNETH BROWN, c/o Friends School, Hobart, Tasmania, Australia.

"I read your magazine and I think it is wonderful! It *should be in all schools* to promote science and American ingenuity." J. S. BACON, Breau Bridge, Louisiana.

"I just got a term paper, my first, back with an 'A' on it. This grade is *largely a result of your magazine.*" BILL NORTON, Marshalltown, Iowa.

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10-22-49



Autumn Woods

➤ A RAMBLE through the woods at any season of the year is wine for the soul. An autumn ramble is sheer champagne.

It is a heady intoxicant whether gulped by the lungful while tramping, dog at heel, or whether sipped by the precious thumbful while reclining easefully in a porch rocker.

The chief ingredients of this giddy mixture are known to all. The profuse bril-

liance of multi-colored leaves thrill even the most jaded. And after the leaves have fallen, and turned brown, every civilized community in the land is fragrant with the smell of burning leaves. A perfumier who could capture this indefinable and incomparable scent and put it up in bottles at so much the ounce would make his fortune. "Burnt Passion" would not be too laud a name for it.

But leaves brilliant and leaves burnt are only the gross ingredients. The autumn recipe is a masterly concoction rendered subtle with pinches and dashes of sight, sound and seasoning.

It is not only the tilled field that comes to autumn harvest. The autumn woods are a cornucopia of nuts, fruits, seeds and berries. There is hazel nut and hickory nut, and fox-grape, wild plum and paw-paw. The flamboyant flowering dogwood hangs out clusters of scarlet berries to give pleasure to man and winter groceries to the white-footed mouse. The doomed chestnut is still to be seen at rare intervals, even though the chestnut blight has all but wiped it out in this country. Botanists take hope from these hardy lonely survivors that perhaps a resistant strain will develop either in the wild or in the tree-nursery. Then perhaps the delicious sweet chestnut wrapped in its characteristic prickly burr, will become plentiful once more.

The observant eye will notice one bloom when all the other trees and plants are long past flowering. This is the witch hazel which flowers late in September or October. When all the other trees are decked out in the traditional fall raiment, the witch hazel shrub is just putting out its blooms. It waits until its leaves have turned a golden yellow, sometimes even until it has shed them entirely, to burst forth in stemless clusters of yellow flowers, each with four long narrow petals. A little later when this floral display is over, the witch hazel adds a percussion instrument to the fall orchestra of sound. The petals fall off, and the pod dries, and suddenly with a snapping, popping sound the witch hazel flings its seeds to a distance of 10 or 15 feet.

All these sights and sounds and smells are part of nature's preparations for winter. For nature they are merely practical, for man sheerly beautiful. Autumn is intoxicating, and each year is a vintage year.

Science News Letter, October 22, 1949

ARCHAEOLOGY

Ancient Ax-Heads Made Of Bone Discovered

➤ DISCOVERY of ancient bone ax-heads that led stone age man on the banks of the Nile to invent a better kind of stone ax, copied from the bone ones, is reported by Dr. A. J. Arkell of London's University College Department of Egyptology.

This new chapter in how the ax with a handle came to be developed was unearthed

at the Neolithic archaeological site of Esh Shaheinab on the west bank of the Nile, excavated by the Sudan Government Antiquities Service this year.

Eleven polished bone ax-heads, ranging from the eight to three inches in length, were found. They were made from long bones of the hippopotamus, rhinoceros, elephant and perhaps other animals. Fragments of 65 other axes were found. All had been given a sharp cutting edge by rubbing on sandstone grinders used by the ancient men for grinding red ochre, favorite coloring material for decorating themselves.

Along with the bone ax-heads, many stone-axes were discovered in the same hearth layer of soil representing many camps. The stone tools were generally smaller although some were the same size as the bone ones.

Dr. Arkell in his communication to the British journal, *NATURE* (Oct. 1), explains that the hunters of the large animals probably first used large splinters of the animal bones for hacking meat off then kill. The next step was to fit the splinter into a wooden handle, making a more efficient hacking tool.

That was the invention of the ax. They naturally tried the new tool on wood, perhaps in hollowing out dug-out canoes and for making spear-throwers. But when the bone ax was not strong enough to cut any but the softest woods, they copied the bone ax in stone.

Thus the chipped and partly polished stone ax-head of the Neolithic age was invented.

A notched fish-hook made from a bivalve shell was also discovered at the same site.

Science News Letter, October 22, 1949

BOTANY-CHEMISTRY

Pine Tree Has Its Spring in the Fall

➤ SPRING has come in the fall to an astonished pine tree which was given a chemical treatment in June.

Typical spring growth in a certain type of wood cell, known as tracheid, was found 10 weeks after a few crystals of heteroauxin had been put in a hole bored in a branch.

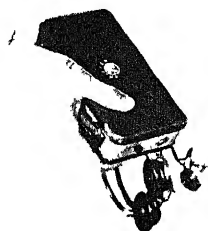
Heteroauxin is a plant growth promoter known to chemists as indole 3-acetic acid. Its season-speeding effect was reported by D. A. Fraser of the Forest Insect Laboratory, Sault Ste. Marie, Ont. When the branch in which the crystals were placed was examined, cells of spring wood growth were found.

The annual rings by which a tree's age is calculated are told by the contrasting appearance between spring and summer growth. Getting typical spring growth in the fall is one of the results of a series of experiments designed to increase knowledge of a tree's growth.

Science News Letter, October 22, 1949

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- BRAZIL: An Expanding Economy**—George Wythe, Royce A. Wight, and Harold M. Midkiff—*Twentieth Century Fund*, 412 p., illus., \$3.50. A study concerned particularly with how the capital and skills of the United States might be helpful in raising Brazil's living standards.
- EFFICIENT USE OF FERTILIZERS**—Vladimir Ignatieff, Ed.—*Food and Agriculture Organization of the United Nations*, 182 p., illus., paper, \$2.00. A monograph bringing together world-wide experience in the use of animal manures, fertilizers, and soil amendments, such as lime.
- EMOTIONAL DISORDERS OF CHILDREN** A Case Book of Child Psychiatry—Gerald H. J. Pearson—*Norton*, 368 p., \$5.00. An immense amount of material on the clinical problems of children who suffer from neuroses, character disturbances and psychoses.
- FIFTH CATALOGUE OF THE ORBITAL ELEMENTS OF SPECTROSCOPIC BINARY STARS**—J. H. Moore and F. J. Neubaumer—*University of California Press*, 31 p., illus., paper, 25 cents. Brief and pertinent data relating to the orbits of these stars.
- FORTUNE POKER**—George S. Coffin—*McKay*, 198 p., illus., \$2.50. A world-wide roundup of material on this game, telling of the mathematical probabilities in obtaining the different poker combinations, for instance a royal flush. Another interesting thing is the author's explanation of the strategy of poker.
- HANDBOOK OF CHEMISTRY**—Norbert Adolph Lange, Compiler and Editor—*Handbook Publishers*, 7th ed., 1920 p., illus., \$7.00. Compiles an immense amount of reference material. A new edition of this well-known handbook.
- HOW LARGE ARE OUR PUBLIC HIGH SCHOOLS?**—Walter H. Gaumnitz and others—*Gov't Printing Office*, 39 p., illus., paper, 25 cents. A statistical report arranged to present data which are readily comparable one state with another and one size group with another.
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- NUTRITION OF THE DOG**—Clive M. McKay—*Comstock*, 2nd ed., 337 p., illus., \$3.50. Revised and extended to include modern advances and more of the older discoveries that are useful in feeding dogs. For dog owners and all those interested in their care.
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- TEXTBOOK OF PHYSIOLOGY**—John F. Fulton—*Saunders*, 16th ed., 1258 p., illus., \$10.00. A reference book revised to include a large volume of new material.
- A TREASURY OF HERO STORIES FOR BOYS AND GIRLS FROM 8 TO 13**—Joanna Strong and Ioin B. Leonard—*Hart*, 191 p., illus., \$2.00. Short biographies of some of our favorite heroes and heroines. For young scientists there is brief information on the Heroes of Yellow Jack, Florence Nightingale, and Admiral Peary.
- TRAINING RURAL LEADERS** An FAO Study—Shantanu Baile School—*Food and Agriculture Organization of the United States*, 136 p., illus., paper, \$1.50. Describes experimental work in training for rural leadership at China's Shantanu Baile school.

VANISHING WILDERNESS—Francesca La Monte and Michael Welch—*Liveright*, 340 p., illus., \$2.49. The life stories of 19 wild animals whose home is the fast vanishing wilderness. The authors have interwoven into these stories a mixture of history, biology, geography, and a wealth of other information. For children and adults.

WIBS IN THE WIND The Habits of Web-Waving Spiders—*Ronald*, 387 p., illus., \$1.50. A report of a two-year study of these superb architects and engineers. The author's approach is unusual in that she knew nothing about spiders to begin with, and so, in this book takes her readers along with her in a step by step journey in the study of these creatures.

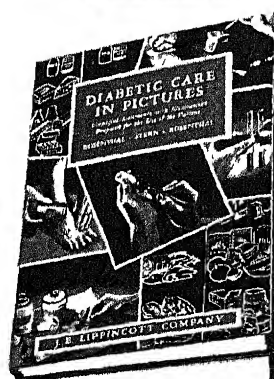
THE YEAST CELL Its Genetics and Cytology—Carl C. Lindegren—*Educational*, 28 chapters, illus., \$7.00. A reference guide containing the latest findings of the author and his associates. The author concludes that Mendelian theory of heredity applies only to a small fraction of the hereditary characteristics transmitted from parent to offspring, however, he differs from Lysenko in that he believes that heredity is under strict genetic control.

Science News Letter, October 22, 1949

America's oldest zoo is the well-known Philadelphia Zoological Garden, now 75 years old.

The mileage of pipelines used in the natural gas industry in America is over 250,000, or 25,000 more miles than all the railroad track.

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⚙️ **ELECTRIC HONE**, for use in homes, factories and on farms, will sharpen tools from kitchen knives to garden hoes without burning blades or grinding them away. Plugged into the household electric socket, it employs what the makers called a magnetic honing action, without use of wheels or gears.

Science News Letter, October 22, 1949

⚙️ **ICE CRUSHER**, built into one of the well-known automatic ice makers, permits the refrigerator to deliver uniformly crushed ice crystals or cubes as desired, by the flip of a switch. It is designed for use in hotels, clubs, taverns and other beverage and food dispensers.

Science News Letter, October 22, 1949

⚙️ **STEEL BRIDGING**, to replace the short wood pieces set in at an angle between joists in floor structure for reinforcement, comes in stock size for joists of any standard depths installed on 16-inch centers. The bridge fits over the top of one, with its ends on the underside of adjacent joists, and requires only two nails to fix in place.

Science News Letter, October 22, 1949



⚙️ **MUSICAL INSTRUMENT** for youngsters, shown in the picture, is described as a cross between clarinet, harmonica and button accordion. It is an inexpensive plastic device with ten button keys regulating the tone of 20 notes, and is capable of covering a wide range of musical selections.

Science News Letter, October 22, 1949

⚙️ **AIR DEODORIZER**, available in handy "aerosol" containers in which it is pressurized by Freon-12, is a non-inflammable and non-toxic type that destroys unpleasant odors by chemical action. This improved spray is claimed to be effective against most odors, including formaldehyde and ammonia.

Science News Letter, October 22, 1949

⚙️ **SUCTION HOLDER**, for the permanent attachment of towel racks and other fixtures to metal, glass or tile without drilling a hole, has a suction cup and a metal shield arranged in such a manner that an can enter the vacuum only by passing through a zone of rubber-like material under compression.

Science News Letter, October 22, 1949

⚙️ **COLOR COMPARER** enables the amateur photographer to match duplicate prints exactly in the developing tray. It is shaped like a four-leaf clover, the leaves in color varying from flesh to dark skies. In the center of each is a hole through which the print is color-matched with the leaf.

Science News Letter, October 22, 1949

Do You Know?

One type of airplane jet engine requires 100 tons of air every hour.

Noise limits may some day become common in American cities as speed limits are now.

Glass is usually a clear transparent material, but when ground to a fine powder it is white like salt.

Nature has endowed most fishes with ability to reproduce far more of their kind than can be reared to usable size in a given body of water.

Common glass is composed of silica sand, soda ash and lime, but there are thousands of special compositions, some quite complex.

White-footed or deer mice often live in hollow trees and are valuable animals because they destroy certain insect life, particularly the destructive pupating larch sawfly.

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THE WEEKLY SUMMARY OF CURRENT SCIENCE



Blanketing the Past

See Page 283

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VOL. 56 NO. 18 PAGES 273-288

AGRICULTURE

Cows Feed Selves In Automatic Barn

➤ AN ultra-modern barn designed as a self-service cafeteria for wintering cattle was announced by Rutgers University, New Brunswick, N. J. This novel solution to the problem of winter feeding is adaptable to both small and large farms.

Designed for maximum cow-convenience and minimum man-labor, the self-feeding arrangement permits the cows to satisfy their hunger at will just as they do in summer pasture. The cows feed through specially designed gates with dividers that safeguard the animals against strangulation.

A winter's supply of hay is stored vertically in huge bins that run the length of the barn. The cows feed from the bottom and the weight of the hay keeps a constant supply at the feeding point.

Its designers believe the new feeder to be a major labor saver. They point out that last winter it took only four man-hours to feed 70 tons of dry hay to 44 beef steers.

The "automatic barn" is one product of farm mechanization experiments conducted by the New Jersey Experiment Station at Fiddler's Creek Farm near Lambertville. Paul M. Mazur, New York banker and owner of the farm, endowed the project and has cooperated with University scientists on it. Some of their other developments, still largely in the experimental stage, are a self-feeding silo, and machines and methods for harvesting and handling hay.

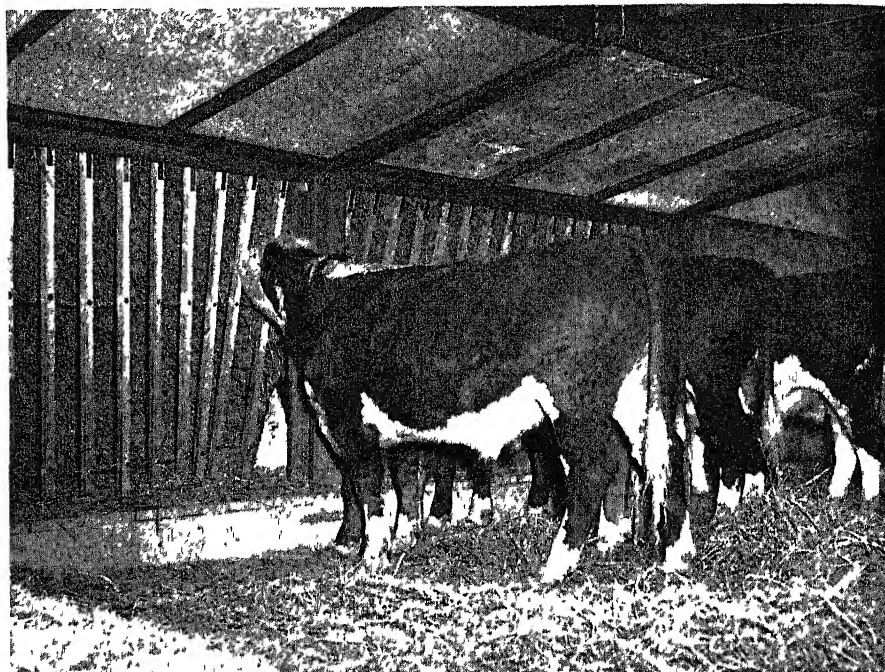
The Fiddler's Creek barn, designs and devices of which are available free of charge for non-commercial use, is described as "a quonset within a quonset." The inner building is the barn proper, where the animals feed themselves and are housed. Over this shed stands another larger structure. The space between the sidewalls of the two semicircular "quonsets" forms the bin where the hay is stored. The hay is blown in through an air hose, direct from the hay wagon into the top of the storage bin.

Another innovation is an air-blowing system through the stored hay, which permits the hay to be dried in the barn rather than in the field where hay-making is at the mercy of the weather.

In the automatic barn and the self-feeding silo, which is being tested this winter, Mr. Mazur and his colleagues foresee the possibility of increased mechanization, even on very small farms.

Science News Letter, October 29, 1949

Joint research by the National Bureau of Standards and the Civil Aeronautics Administration has developed a coating for fabric-covered aircraft that about doubles the time between ignition of the fabric and its destruction by fire.



SELF-FEEDER FOR CATTLE—Farm labor and costs are greatly reduced by permitting cattle to feed themselves through specially designed gates.

MEDICINE

Chemicals Aid Leukemia

Anti-folic acid chemicals bring temporary improvement in leukemia. Two other chemicals, nitrogen mustard and urethane, give relief in tumor ills.

➤ CHEMICAL treatment of more than 200 persons suffering from cancer-like acute leukemia has brought about significant temporary improvement in from 11% to 50% of the cases.

Other forms of cancer have also been temporarily aided by the same chemicals, which are known to be antagonistic to the folic acid vitamin.

Dr. Carl V. Moore of the Washington University School of Medicine, St. Louis, reported these encouraging results to the meeting of the American College of Surgeons in Chicago.

Dr. Moore has himself treated 17 patients with significant temporary improvement in six. Other doctors have treated 203 patients with the anti-folic acid chemicals, with remissions ranging from 11% to 50%.

One of Dr. Moore's patients, a four-year-old boy, has been practically well, or as the doctor put it, "in fairly complete remission," for a year.

The chemicals used are aminopterin, amethopterin, and Amino-An-Fol.

Children apparently are helped more than grown-ups by these anti-folic acid chemicals, Dr. Moore said, and other doctors' work suggests. He emphasized,

however, that the chemicals do not cure and that they cause severe toxic reactions. Painful inflammations and ulcers of the mouth, diarrhea and hemorrhage from stomach and intestines are among the toxic reactions caused by these chemicals.

Nitrogen mustard, the war gas chemical, often brings striking temporary improvement in Hodgkin's disease, and another chemical, urethane, has been helping patients with a bone marrow tumor, called multiple myeloma.

"It is obvious that the goal of destroying tumor cells without irreparably damaging normal tissues has not been attained," Dr. Moore declared.

"It is equally evident, however, that many of these substances are now of practical clinical value as palliative (relieving but not curing) agents in the management of patients with neoplastic (tumor) diseases, and that results are good enough to suggest that the ultimate goal of this type of chemotherapy may yet be achieved."

The "most important single practical development" in chemical treatment of cancer, he declared, probably is the use of female sex hormones in the treatment of cancer of the prostate gland.

Science News Letter, October 29, 1949

MEDICINE

Surgery on Beating Heart

Surgical repair of defects in the heart will be aided by the development of an artificial half-heart, which will take over the functions of the right side.

➤ AN artificial half-heart, announced to the American College of Surgeons in Chicago, will give surgeons a better chance to cut open the heart itself for surgical repair of defects.

In order to operate on the "open heart," it is necessary to have some means of keeping blood circulating through the body and also of continuing to get oxygen into the blood.

To meet this problem, William H. Sewell, Jr., and Dr. William W. L. Glenn of Yale University School of Medicine devised the artificial half-heart.

A pump takes over the functions of the entire right side of the heart. This is the side to which blood that has circulated through the body is returned by the veins. Before going into the left heart, to be pumped back through the arteries to the rest of the body, this blood from the veins is pumped through the lungs. There it picks up vital oxygen.

To use the new device, the surgeon cuts into the jugular vein on one side of the neck. A tube of polyethylene plastic is in-

serted through this vein into the big vein which brings blood back from the head, neck, arms and chest. The same polyethylene tube is run down this big vein into and through the right side of the heart and into the big vein that delivers blood from the trunk and legs.

Holes are made in the part of the tube that will lie in the two big veins but the part that is in the heart has no opening. All the blood being returned to the heart by the veins can be drawn through this double-holed tube into the artificial half-heart, or pump. By changing the pressure in the glass cylinder around the pump from negative to positive, the blood is driven through another tube into the artery leading to one lung. From there on it follows its normal course, picking up oxygen and returning to the left side of the heart to be pumped back into the body.

The artificial half-heart was used on two dogs for one hour and for one hour and three-quarters, respectively. Both dogs recovered completely and are alive now, several months after the experience. In a third dog, the heart stopped because of a

technical error with the artificial respiration machine.

Blood pressure did not change after the artificial half-heart was in operation. When it had been in operation for an hour or more there was sometimes a fall in blood pressure and a decrease in blood flow.

Science News Letter, October 29, 1949

MEDICINE

Plastic Balls Substitute For Heart Valves

➤ HOLLOW lucite balls can be used as substitutes for valves in the heart and at the entrance of the main artery, or aorta, to the heart, Dr. Charles A. Hufnagel of Harvard Medical School told the American College of Surgeons in Chicago.

The lucite valves have functioned well for prolonged periods of time in the aorta of dogs, without causing blood clots and without eroding. These substitute valves have been inserted into the hearts and aorta of 20 animals with no deaths due to failure of the valve or to the operation of inserting it. One dog has even gone safely through pregnancy and delivery of her young.

Development of the lucite valves followed earlier work in which methyl methacrylate plastic was used to replace successfully and permanently parts of the aorta in the chest.

Science News Letter, October 29, 1949

ENGINEERING

Predict New Energy Sources At Laboratory Dedication

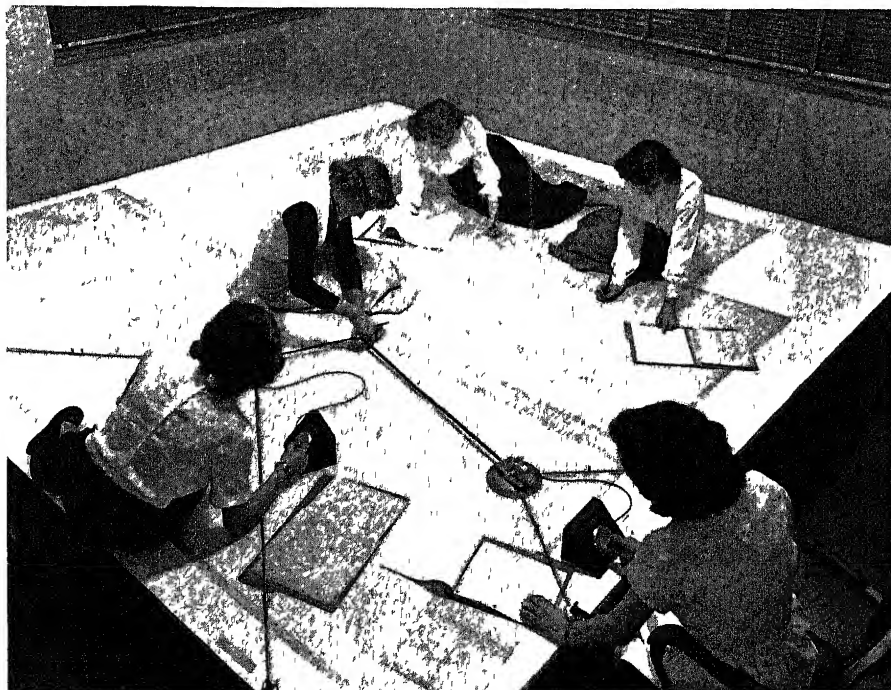
➤ HUMANITY will be faced with catastrophe within a period of a few centuries through exhaustion of our fossil fuels, oil and coal, unless science can come forth with fundamentally new discoveries, Dr. Paul D. Foote, Gulf Oil research director and vice-president, declared at the dedication of the Leovy Geophysics Laboratory, at Har-marville, near Pittsburgh.

These new discoveries will be made if research is adequately supported, Dr. Foote declared. Any moratorium on science and technology would be fatal to economic security, he said, and "the only opportunity for continually improving our standard of living is the most intensive development of science and technology." He predicted discoveries in the production and utilization of energy surpassing anything we know today.

Named for Frank Adair Leovy, Gulf Oil Corporation pioneer in scientific oil exploration who died in June, the new laboratory is the world's largest building devoted to research on oil prospecting.

Four producing oil wells are struck by geophysical methods to every one found by unscientific oil prospecting.

Over half of the new building's 126 modern rooms are devoted to interpreting prospecting data from more than 500 pros-



SEARCH FOR OIL-BEARING ROCKS—These women are plotting information gotten by magnetic surveys which will help Gulf geologists decide if a given area has prospects of being an oil producer.

pecting parties in all parts of the world, many of them air-borne. Aerial prospecting crews using a Gulf-developed magnetom-

eter survey hundreds of miles of territory a day

Science News Letter, October 29, 1949

MEDICINE

Active Despite One Lung

➤ A 21-YEAR-old girl who had one lung removed when she was a child is now a champion gymnast

A 19-year-old boy, also with only one lung, is doing construction work at 4,000 to 5,000 feet above sea level. At this altitude the low oxygen of the air makes many a two-lunged person puff and pant on a short walk.

These two young persons were cited at the American College of Surgeons meeting in Chicago as examples of the outcome of removing an entire lung in a child. They are among 22 children who underwent this operation at Barnes Hospital, St. Louis. Studies of the present condition of the survivors were reported by Drs. R. M. Peters, A. Roos, H. Black, T. H. Buiford and E. A. Graham.

Of the 22, five died immediately after the operation. One lived eight years but died in an accident. Two are too young for satisfactory evaluation and four cannot be located. One has extensive disease in the remaining lung, which makes physiologic evaluation valueless.

The remaining nine include six girls and three boys. Their ages at the time of lung removal ranged from three to 14 years. Conditions for which the lung was removed were bronchiectasis, lung abscess, a granuloma, or tumor, of unknown cause, and the chronic infection actinomycosis.

These nine young people are all now leading a normal life, some having been operated on as long ago as 13 years. None has any significant curvature of the spine or other cosmetic deformity.

"One of the most striking and provocative findings from our studies," the doctors reported, "is that the best performance on all tests was found in the two most active patients, the gymnast and the construction worker, both of whom had made a concerted effort to overcome their handicap."

Children whose parents did the most to keep them from activity seemed to be the poorest performers.

Science News Letter, October 29, 1949

MEDICINE

Skin Burns from X-Rays Preview Atomic Exposures

➤ TREATING the common and dangerous skin burns caused by exposure to radiation gives doctors a preview on a small scale of what they will be called on to treat in the event that the atom bomb is used in another war.

These burns are at present most prevalent in doctors who use X-rays and fluoroscopes for treating patients, but this hazard is expected to decrease in this group. Dr. James Barrett Brown of Washington University School of Medicine, told the American College of Surgeons meeting in Chicago.

The burns are chronic, caused by repeated small exposures, and became progressively worse. It may take five to 25 years but cancer will eventually develop, Dr. Brown pointed out, if the burns are not removed by surgery.

If treatment is given early before the

ulcerated infected stage is reached it is effective and brings immediate relief of pain. It is necessary to cut out the burns deeply so that only healthy tissue is left and then repair the area with skin grafts.

Dr. Brown said that this type of burn will probably be seen on a mass scale if we have another war in which the atom bomb will be used. But surgeons will be able to combat the destructive power of the weapon with the knowledge they have gained in peace time.

Science News Letter, October 29, 1949

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PSYCHOLOGY

Strikes Are Preventable

Psychologists have the "know-how" to diagnose causes and apply remedies to the social disease of which strikes are a symptom.

➤ *PSYCHOLOGISTS and sociologists could help industry prevent strikes like the present work stoppage in the steel and coal industries. They have the necessary "know-how" to cure friction.*

Strikes are symptoms of social sickness, just as fever is a symptom of physical disease. This is the opinion of psychologists queried by Science Service.

Modern doctors do more than give fever patients cooling baths to reduce fever. They go after the germs or other cause of the fever to get the patient well.

Social psychologists have better ways of treating social sickness than prescriptions for cooling off periods to avert strikes. They, like doctors of medicine, can diagnose the causes and apply remedies that will get the patient—in this case society itself—back on the road to health.

Strike Is Symptom of Underlying Social Ill

By DR. DORWIN CARTWRIGHT

Director, Research Center of Group Dynamics, University of Michigan.

➤ A STRIKE should be conceived as a symptom of deeper and more complex social malfunctioning. This social illness has important causes stemming from economic and political institutions as well as from the behavior of individuals and smaller groups.

It is a characteristic of symptoms that they cannot be satisfactorily eliminated by dealing with them directly. Action can and must be taken to prevent their getting out of hand; the patient's fever must be reduced. But future attacks of the disease will be certain to arise unless the underlying causes are dealt with. This means that any attempt to prevent strikes by direct repressive action could at best only produce other symptoms of the same social illness.

Social science possesses the research tools needed for analyzing the social disease created by the current strike. The federal government could well afford to sponsor a commission of scientists to analyze specifically the causes underlying these recurrent strikes. Such a commission should examine the major sources of tension from the point of view of economics, sociology, political science, and social psychology. It would, of course, be devoted to the search for facts, and the discovery of causes and effects, and would therefore, be in no sense partisan. Only through such a genuinely scientific diagnosis can an effective remedy be prescribed. Although there is no precedent for such a commission, research techniques and scientific knowledge have developed in recent years to such a level that a significant contribution to the reduction of tension in the coal and steel industries could now be made.

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Known Science Techniques Work in Settling Disputes

By DR. FRANCIS BRADSHAW

Consulting Psychologist, Richardson, Bellows, Henry & Co., New York City

➤ EXPERIENCE in conciliation in cases of labor strife and also marital relations and other types of friction show that four techniques are effective:

1 The disputing parties may be brought together to tell their troubles to a counsel. The counsel refrains from telling them what to do, but directs the discussion in such a way that the parties concerned think out their own course and arrive at their own agreement.

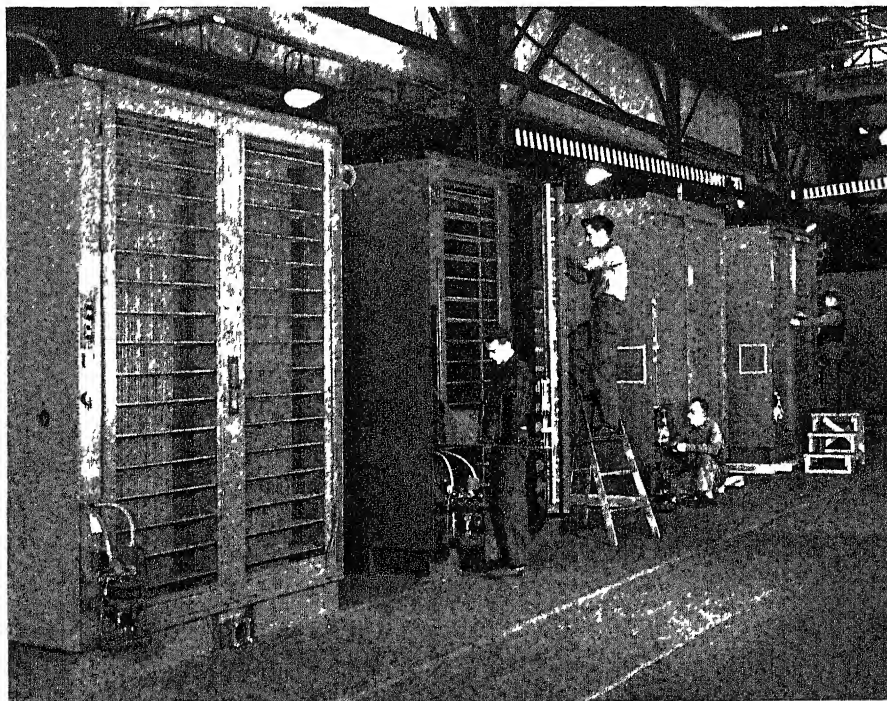
This technique, known as "non-directive counseling" has proved very effective also in the treatment of the mentally disturbed, whose conflict is internal.

The difficulty in applying this method in industrial disputes is that in order for it to work, the counsel must be invited or sought out by both parties. In an industrial dispute, one or both sides may lack any desire to arrive at a settlement.

2 The second technique is to tell the disputing parties to try this or that so that they will arrive at their own solution through experiment. This technique also works better in reconciling married partners than industrial associates.

3 The third technique is to arrange a change in the conditions which are instrumental in producing the friction. Thus a change in economic or political conditions might make it easier for industrial strife to come to peaceful solution.

4 The fourth technique is to change the attitudes of the key individuals toward themselves and toward each other. It has not been widely used because it is so difficult to achieve. It is very difficult to change



DUST VAULTS—Electronically-scrubbed air for steel mills is in the making on this assembly line at the Westinghouse Sturtevant Division plant in Hyde Park, Boston, Mass. The vault-like cubicles contain Precipitron cells, the electronic air cleaners which remove 90 percent of all air-borne dirt and dust. Each of these cubicles can clean more than 36 tons of air every hour.

an adult's way of looking at things, his notions of what he wants to get out of life, his feeling toward other men. Still it is not impossible.

Here are some of the ways attitudes can be changed.

One way to change a man's attitudes (and it is obvious in this case that somebody must change) is to search out the facts of the dispute by scientific methods.

Both sides in any industrial dispute must rely for strength in the show-down on the support of their constituencies and some of the public. Yet neither one actually knows what the men behind him really want. A scientifically conducted survey of what is wanted and needed by the stockholders, management, and the public would show each the limits of support on his side and just what he might concede without betraying his trust.

Psychological research and practical application in industry has demonstrated the value of "vertically organized" round-table discussion for producing attitude changes necessary to bring about industrial conciliation and peace.

This means bringing together not just the two top men in the dispute, but representatives of all the levels all the way down to the foreman who has direct con-

tact with the workers and the shop steward who is the worker's adviser in dealing with management.

Such round-table discussions should be implemented with all the tools known to psychological science. Sometimes it is found that the words basic to the discussion are not understood by those involved. In one situation, tests revealed that the average supervisor failed to understand 80% of the words used in the contract under controversy. The average union's shop steward missed 70%. Attitude tests given before and after discussion show that the participants do change their attitudes as a result of frank discussion in such a round table.

What is needed to prevent strikes is the determination by management to use systematically what is known to science. They must realize that human nature is as real and important in their business as are dollars invested or machines and materials. They should pay as much attention and spend as much money on research in human and personnel relations as they do on product research.

Tension and hostility must be located and reduced before it piles up like static charges to produce an explosion and uncontrollable catastrophe.

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METEOROLOGY

Watch Smog Weather

➤ A STRICT watch of the weather is the chief of 10 U. S. Public Health Service recommendations for preventing future smog catastrophes such as hit the small industrial town of Donora, Pa., a year ago this month (Oct. 27, 1948).

If forecasts show a possibility of weather inversion, industrial plants should either be shut down or cut down their operations enough to reduce "sharply" the amount of contamination going out into the air.

A weather inversion, such as lasted five days in Donora last October, occurs when a layer of warm air settles over the ground air, preventing the usual updrafts.

The other nine Public Health Service recommendations have to do with reducing the gaseous and solid particle contamination of the air from both industrial plants and home heating plants, steam locomotives and steamboats. The recommendations come from an 11-month exhaustive study of the Donora situation. They presumably apply to other areas where a combination of air contamination and weather inversion produces smog.

Besides the 20 deaths at Donora last year, almost half the town's population were made sick by the smog, the Public Health Service scientists found.

With the Donora study giving "positive scientific proof" that contaminated air in industrial areas can cause serious acute disabling illness, the Public Health Service

plans an expanded program for fighting air pollution.

The possibility of the mind being affected, in terms of reduced alertness and efficiency, from living in constantly polluted air, is one of the serious questions the Donora study has raised, Dr. Leonard A. Scheele, Surgeon General of the U. S. Public Health Service, pointed out.

A preliminary report of the study was given by H. H. Schrenk, Harry Heimann, George D. Clayton and W. M. Gafafer of the Public Health Service and Harry Wexler of the U. S. Weather Bureau.

Science News Letter, October 29, 1949

BOTANY-CHEMISTRY

Fertilizing, Fumigation Done in Single Operation

➤ A SINGLE spraying operation that kills plant pests and supplies plant foods at the same time was suggested to chrysanthemum growers.

At the flower show sponsored by the New York Botanical Garden and the National Chrysanthemum Society in New York, Dr. P. P. Pirone told of the recent development of a method of spraying plant nutrients directly onto the foliage instead of adding them to the soil. That was the old-fashioned way," said Dr. Pirone, a member of the Botanical Garden staff.

Although spray feeding is "still largely in the experimental stage" four or five applications weekly produce "vigorous, deep green foliage."

The newest insecticide for chrysanthemums, Dr. Pirone said, is the highly poisonous preparation called Parathion. It is almost totally effective against insects in one or two applications. Because it is dangerous to handle, he warned users to follow directions "to the letter" both indoors and out. By mixing Parathion, or the fungus-killer Fermate, with liquid fertilizer, "pest control and better foliage growth are achieved in one operation," Dr. Pirone pointed out.

For destroying the foliar nematode, a microscopic worm which blights chrysanthemum leaves, a solution of sodium selenate is applied to the soil. Because sodium selenate too is highly poisonous, Dr. Pirone cautioned against planting food crops in treated soil. Food grown on such soil will absorb some of the poison rendering it unfit for human consumption, he said.

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ENGINEERING

Coal Mine Safety Aided by Preventing Electric Arcs

➤ A FORWARD step in safety in coal mining comes from recent developments to prevent electric arcs or sparks jumping from power lines or car tracks to the tubing that brings air to the compressed-air blasting device now used in many mines.

Such arcs or sparks may cause explosions and fires in a coal-dust laden atmosphere. Details of two recent developments have just been released in a report of the U. S. Bureau of Mines which is available free from the publications section of the Bureau at Pittsburgh. It is entitled *Two Devices to Prevent Electric Arcs with Airdox Operations in Coal Mines*.

Airdox is a system of blasting out coal faces with compressed air instead of the usual explosives. Giving no spark, it creates no fire hazard. It is now in wide usage particularly in Indiana and Illinois coal fields. The breaking of the coal comes from the sudden release of the compressed air within an ordinary drill hole in the coal.

With the Airdox, compressed air is brought to the working area by steel pipes, and copper tubing carries it from a control valve to the Airdox shell at the coal face. The first safety device is a steel-reinforced rubber-jacketed tubing 50 feet long to replace the copper tubing. The second safety device is a coupling consisting of two small steel blocks with insulated bushings installed between the copper tubing and the steel line. Similar couplings are placed at 1,000-foot intervals in the air line. These will aid in preventing sparks at the face.

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MEDICINE

Averting Polio Damage

There is some hope that nerve injury and crippling will be prevented in the future by treating polio victims with blood plasma and its albumin fraction.

➤ HOPE that infantile paralysis patients may be helped to escape nerve damage and crippling by treatment with blood plasma or its albumin fraction appears in research by Drs. Robert M. Eaton and Albert G. Bower at Los Angeles General Hospital.

The hope is based on three points: 1. The amount of albumin in the blood of infantile paralysis patients was often found to be lower than normal. The more severe the disease, the lower the amount of albumin.

2. Albumin is known to be important for keeping the fluid part of blood from leaking through blood vessel walls into the tissues.

3. Such leakage and accumulation of fluid, known medically as edema and familiar to the layman as dropsy, would be especially likely to injure the spinal cord. Even a small accumulation of fluid could cause damaging pressure because the spinal cord is encased in hard bone. Destruction of nerve cells in the spinal cord is what causes the crippling and paralysis in infantile paralysis. Preliminary results in

treatment of 76 patients are in accord with this theory, Drs. Eaton and Bower report in the journal, SCIENCE (Oct. 21).

"Generous amounts" of plasma, from one

ENTOMOLOGY

Giant Snails Repelled

➤ THE Giant African snail has not yet invaded the United States, quarantine officials say. The notorious plant destroyer has made several dockside beach-heads, but on each occasion it has been repulsed by the vigilant authorities.

In scattered instances the snails are kept for scientific purposes, but they have attracted the most attention recently when they were discovered at east and west coast ports in cargoes of surplus war material from the Pacific. Fifteen such snail-infested shipments have been discovered. In all cases a chemical fumigant or live steam was used to kill them.

Publicity given to these unwanted stowaways has caused worried farmers and gar-

deners throughout the country to write to Washington, claiming that giant snails are eating up their vegetables and flowers. In every case investigated so far the offender turns out to be a local snail that has been there all the time. In no case has the giant African snail been found at large.

Blood plasma has been given polio patients in the past, they point out. But this was done with the idea of giving the patients the immune, or anti-polio, substances in the globulin fraction of the plasma, somewhat as immune serum globulin is now used to ward off or reduce the severity of measles. Their theory is that the albumin of blood, with its anti-edema action, is the part that will be helpful.

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deners throughout the country to write to Washington, claiming that giant snails are eating up their vegetables and flowers. In every case investigated so far the offender turns out to be a local snail that has been there all the time. In no case has the giant African snail been found at large.

The efforts of the Bureau of Entomology and Quarantine to repel the giant snail have been completely successful, despite the fact that they have no legal power to quarantine snails. Quarantine laws are clear and unequivocal when it comes to insect pests, but no mention is made of the mollusks, the phylum to which snails belong. Congress had before it a bill introduced by Rep. Wingate H. Lucas (D., Tex.) that would remedy this omission, but it was not enacted in the rush of adjournment.

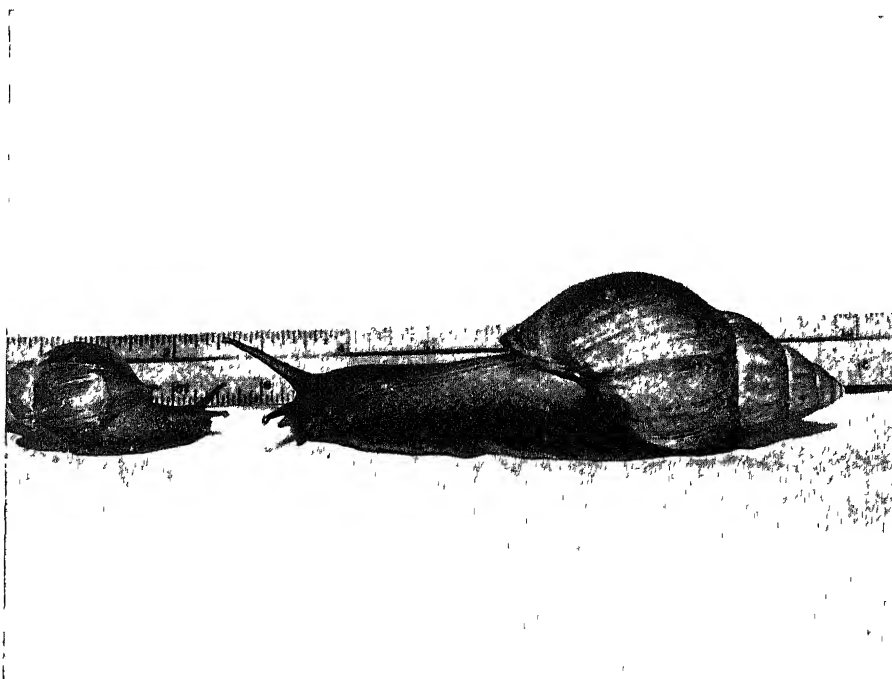
The snail that has given the most trouble in this country is a European variety that was introduced into California in the 1850's. Hundreds of thousands of dollars are spent every year to wipe out this pest which feeds on the choicest garden crops. In localized areas in Florida and Texas snails have caused damage, but on the whole the 800 or so native types and the 50 imported types have never reached serious pest proportions.

The Giant African snail, which started in the sub-tropics of its native Africa, has been carried steadily eastward through India, Ceylon, East Indies, the Marianas, and finally Hawaii. It is thought that the Japanese introduced them throughout the Pacific Islands as a food source for their soldiers. When the Japs departed, the snails rapidly multiplied to the point where they have become a serious menace to island agriculture. (See SNL, July 17, 1948, p. 44).

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Modern farm machinery is little used in Egypt because of cheap labor and small farms.

Fish ginning, with a pronged spear, is said to be about 10 times as efficient as the hook and line method, that is why the gig is unpopular with hook-and-line sportsmen.



NO ADMITTANCE—Quarantine officials are on the look-out for these stowaway giant snails and let them know in no uncertain terms that they are unwanted. So far none have succeeded in invading the U. S. for when discovered in ship cargoes they have been destroyed.

PSYCHOLOGY

Concentration Important For Success in Biology

► **SUCCESS** in biological science depends more on ability to concentrate personal forces than on sheer intellectual capacity, Dr. Anne Roe, of New York City, discovered in a clinical psychological study of 20 of the country's most eminent research biologists. All of the biologists, she stated, are active in research and all but three are members of the National Academy of Sciences or the American Philosophical Society.

These men of science are either disinterested in other persons or ill at ease with them. Their sex development is retarded. They are not inclined to fight, but they are stubborn.

Many are suffering from deep-seated anxieties and many have had painful experiences in childhood. Research has proved to be emotionally satisfying and relieving to them. The educational and occupational level of their parents was generally superior and at least one parent has valued education as good in itself. Dr. Roe reported her findings to the American Psychological Association at Denver, Colo.

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AGRICULTURE

Fertilizer Output Hits World Record, FAO Says

► **WORLD** production of commercial fertilizer of more than 11,500,000 tons sets an all-time record high, the Food and Agriculture Organization of the United Nations reported.

These figures, which exclude Russia, compare sharply with the 1938 total of 9,000,000 tons. The increase represents the sustained high levels of fertilizer production achieved in the Western Hemisphere plus the recovery of war-damaged areas to pre-war levels and higher.

Essential to the efficient agriculture needed to feed an increasing world population, commercial fertilizer is required in even larger quantities. Although the rate of production continues to increase, the FAO foresees that demand will continue to exceed supply for some time to come.

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BIOCHEMISTRY

Basic Cellulose Particles Of Plants Discovered

► **DISCOVERY** of the real elementary particles of cellulose, one of the basic substances of all plants, including wood, cotton, etc., was revealed in a paper by Dr. The Svedberg, Swedish chemist, upon the occasion of the award of the famous Franklin Medal, highest honor of the Franklin Institute in Philadelphia.

Consisting of equal-sized rods of small size, visible by means of the electron microscope but far beyond the reach of the ordinary microscope, these cellulose particles or molecules seem to be the same whether they are in wood closely bound to lignin or in the fine hairs on cotton seeds. Dr. Svedberg's communication, sent from Sweden, explained that these and other giant molecules can be sorted out in the ultracentrifuge, a research upon which he has spent nearly half a century and which has brought him world recognition.

The way in which the cellulose in plants is formed is different than the way other big molecules are synthesized in non-living matter. This may give useful hints toward understanding living processes.

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ENGINEERING

Gas Escape Reduces Oil Flow to Output Wells

► **IT IS** gas released from petroleum deep underground that reduces or prevents the flow of the crude oil through the oil-bearing rock into the well bore which leads to the surface of the ground, according to Dr. Donald L. Katz, professor of chemical engineering at the University of Michigan.

This belief was recently discussed by him at a San Antonio, Texas, meeting of the American Institute of Mining and Metallurgical Engineers. Rapid decrease in the fluid output of some oil wells may now be explained, he said. The low production is mainly due to phenomena occurring when the pressure of the oil is reduced to a point where the gas escapes from the petroleum.

The gas is then absorbed by the porous sandstone rock, thereby reducing the ability of the oil-bearing rock to conduct the liquid to the well. The rate at which the oil pressure drops is dependent upon the type of sandstone configuration that contains the oil deposit. When oil passes from a large pore in the sandstone bed to a smaller pore, the velocity increases and the pressure drops, he stated. The gas then escapes.

When oil wells gradually stop pouring forth crude oil the only solution has been to shut the wells down until the pressure increases. In this period the liberated gas is reabsorbed by the liquid and the crude oil can then flow quite freely. With a clearer understanding of the activity occurring when oil pressure is reduced, petroleum engineers can now work more effectively to prevent the slowing down of production.

The conclusions of Dr. Katz are based on investigations conducted to study the permeability of sandstone samples when oil at different pressures was passed through the material.

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MEDICINE

Rapid Thawing Found Best for Frostbite

► **FAST** thawing gives best results in treatment of frostbite. Experiments showing this, which is contrary to previously held views, were reported by Drs. Joseph C. Finneran and Harris B. Shumacker of Indiana University Medical Center at the meeting of the American College of Surgeons in Chicago.

The "ideal temperature" for the rapid thawing is one slightly above body temperature, they found. Too much heat is bad, they cautioned.

The rapid thawing is effective in part at least, the experiments suggested, because it shortens the period during which tissues are frozen and temporarily bloodless.

Anti-blood clotting drugs and measures for dilating the blood vessels gave variable results but seemed generally beneficial, especially when combined with rapid thawing.

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ENGINEERING

Aluminum and Electric Industry Closely Related

► **THE** close relationship that exists between aluminum production and the electrical industry was pointed out at the meeting in Cincinnati of the American Institute of Electrical Engineers by Donald M. White, secretary of the Aluminum Association, New York City.

The present cost of aluminum, 15 to 17 cents a pound, is due to the availability of cheap electricity, he said. Some 1,250,000,000 pounds of aluminum are produced annually, and in its production some 12,500,000,000 kilowatt hours of electricity are used.

New uses of aluminum are developing daily, Mr. White added, and more and more electrical energy will be required to produce it. Aluminum now has more than 4,000 applications.

History and growth of the aluminum industry have closely paralleled those of the electrical industry. Electrical progress has brought cheaper electric power, cheaper power has meant cheaper aluminum, and cheaper aluminum has led to new uses and mounting demands for the metal.

Electric energy is an essential ingredient of aluminum, Mr. White stated, and represents some 20% of its total cost.

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E FIELDS

MEDICINE

Polio Cases Expected To Be High Next Year

➤ NEXT year will be another big infantile paralysis year. There may be more big years to follow.

"The end is not in sight" to the upward trend in this disease, Surgeon General Leonard A. Scheele of the U. S. Public Health Service declared at a conference of health officers in Atlanta, Ga.

He predicted that there will be between 40,000 and 45,000 cases by the end of this year, making 1949 "the most devastating year in the history of the disease."

The "marked upward trend" of the disease has been continuing since 1943. Before that there was a period of about 10 years when the number of polio cases was "moderate."

"New knowledge is urgently needed so that steps can be taken to control poliomyelitis," Dr. Scheele declared.

Whether the virus of the disease is spread through the air, or in food or by flies are questions to which answers are now being sought by scientists at the U. S. Public Health Service's Communicable Disease Center.

A definite relation between deaths of infants from diarrhea and the degree of fly control in the community has been found, he reported.

"If fly control can be attained under certain conditions," he said, "from one-third to one-half of all the intestinal dysentery can be prevented."

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METEOROLOGY

Better Weather Forecasts By New German Methods

➤ IMPROVED wind and weather forecasts may result from weather analysis methods developed in Germany during and since the war, H. Dean Parry of the U. S. Weather Bureau said.

The German technique consists, in part, of dividing the upper air for analysis purposes into four equal layers up to a height of 72,000 feet. Usual practice divides the air into four unequal layers to a height of 53,000 feet. The equally thick layers in the German method, Mr. Parry said, "result in a building block arrangement making it more convenient for the meteorologist to integrate the surface and upper air charts into a single unified picture."

Another difference, Mr. Parry noted, is that the German air charts give a better picture of air movements over areas where data are sparse, such as over oceans. The

German technique could result, he said, "in more accurate wind forecasts for aircraft over oceanic areas or in an improvement in particular cases of the forecast of general weather conditions."

Mr. Parry spoke before the District of Columbia branch of the American Meteorological Society. He has recently returned from a three-year assignment in Germany where he was chief of the Meteorological Branch of the Office of Military Government.

In addition to these methods of analyzing and charting the weather data, a "teachable procedure" for applying these data to "tomorrow's weather map" has also been developed, Mr. Parry said.

Science News Letter, October 29, 1949

VETERINARY MEDICINE

Canned Reducing Diet Is Available for Dogs

➤ IF your dog is too fat for his health, you can now buy a special canned reducing diet on veterinarian's prescription.

And when Suzette is going to have puppies, she can have a diet scientifically designed for her best nourishment while she is expecting. The same diet may be given the pups when they are born.

These diets, together with one for mature dogs and dogs with kidney disease, and another for dogs with intestinal diseases have been developed by Dr. M. L. Morris, a practicing veterinarian and specialist in animal nutrition, of New Brunswick, N. J.

Science News Letter, October 29, 1949

ENGINEERING

Photo Copying Device Makes Print of Book Page

➤ A TIME-SAVING tool to serve in scholarly research by making hand-copying from library books unnecessary was revealed by Yale University. It is a compact photographic copying device, usable by anyone and small enough to fit into a briefcase.

This device, developed by Frederic G. Ludwig, Yale Library photographer, is dubbed the "Contoura" because it can snap a contact photo of a book page even where the paper curves into the binding. It produces reversed negative prints, but these can be read by a built-in mirror or positives can be made from them.

The apparatus is in a light metal case but has a bottom of what Mr. Ludwig calls a light equalization mask and a translucent inflated cushion. The equalization mask, he says, is the secret of the Contoura's compactness. Without it, the lights within the device, six electric bulbs, could not be brought so close to the subject matter being copied. The cushion can be inflated and deflated as needed.

Science News Letter, October 29, 1949

MEDICINE

Crystalline-Like Form of Skin Tumors Discovered

➤ CRYSTALLINE-like clusters of particles, arranged somewhat like plant virus particles, have been discovered in wart-like tumors of human skin, four Yale University medical scientists reported at the meeting of the Electron Microscope Society of America in New Haven, Conn.

The skin tumors they studied are called papillomas.

The common wart and normal skin, when prepared for electron microscope study, showed no uniform particles but instead seemed to be merely shapeless, scattered clumps of matter, collagen fibers and spherical particles of varying diameter.

Characteristic brick-shaped particles, called elementary bodies, were seen in preparations from another skin ailment, *molluscum contagiosum*, which is caused by a virus.

The scientists reporting these studies are Drs. Joseph L. Melnick, Maurice J. Strauss, Henry Bunting and Ernest Shaw.

Science News Letter, October 29, 1949

AERONAUTICS

Fewer Runways at Airports New Federal Policy

➤ ONLY one runway in the future will be built with federal financial aid at Class I (Personal) airports, the Civil Aeronautics Administration has announced. These are small airports designed to serve small planes and with landing strips less than a half-mile in length.

The new policy applies to construction or improvement in both new and existing airports in this classification. In addition, the new policy states that on all other classes of airports the construction of an additional runway or runways will be approved only for the purpose of handling traffic volume, and that runways on which Federal funds are expended will be non-intersecting with any existing runway and must be either parallel or diverging.

In making the announcement of the new policy, D. W. Rentzel, CAA administrator, pointed out that single-runway airports can be located closer in to the communities to be served and with less cost of construction. In addition, traffic patterns are simplified and safety increased.

The CAA has encouraged single-strip airports ever since the Federal Aid program went into effect. This federal office, which administers the aid program, has now gone one step forward from mere "encouragement." Deviations from the new policy will be permitted only when approved by the Washington office, after being justified by exceptional conditions other than wind coverage.

Science News Letter, October 29, 1949

ASTRONOMY

Orion Appears in East

Other stars of the first magnitude can be seen in the west. Planets Venus and Jupiter are brighter than any stars in the evening sky but they set very early.

By JAMES STOKLEY

► WITH the beginning of winter less than two months away, the brilliant constellation of Orion, the warrior, now comes into easy view in the evening skies. Our maps, which depict the heavens as they appear about 10 p.m. at the first of November, an hour earlier at the middle of the month, and 8 p.m. at the end, show this figure in the east. The three stars in a vertical row mark Orion's belt, Betelgeuse, to the left, is in one shoulder, and Rigel, to the right, indicates one of his feet. As he rises, Orion is on his back, though by the time he stands high in the south we see him in a more dignified position.

Just above Orion is Taurus, the bull, with first magnitude Aldebaran in the animal's eye. To the left of Taurus, we see Auriga, the charioteer, with bright Capella. Below this figure stand Gemini, the twins, with Castor and Pollux (the brighter of the pair) as the most conspicuous stars.

For other stars of the first magnitude, we must look toward the western half of the sky. Standing vertically in the northwest is the "northern cross," actually part of Cygnus, the swan. Below it and a little to the right is Lyra, the lyre, with the star Vega, while Altair, in Aquila, the eagle, stands to the left. And low in the southwest we find Fomalhaut, in Piscis Austrinus, the southern fish. Some other fishes may be seen still higher, the constellation of Pisces, below and to the left of the "great square" of Pegasus, the winged horse.

Planets Outshine Stars

The two planets visible these November evenings are brighter than any of the stars mentioned. These are Venus and Jupiter, but they set so early that the former fails to get on our map at all, while the latter barely makes it, being shown just above the horizon in the southwest. In this position its brightness is greatly dimmed.

Ever since last April, when it was practically behind the sun, Venus has been drawing to the east of that body, and on Nov. 20 is at its farthest distance. Usually, this would mean that Venus is seen high in the western evening sky, long after sunset. However, it happens now that the path along which the sun and planets move is very low in the southern sky. Therefore, even though Venus, on the 20th, is 47 degrees from the sun, it merely means that it is farther to the south, and not as much higher as one might expect it to be. How-

ever, at sunset, Venus is about 20 degrees above the southern horizon, to the southwest, and of magnitude minus 4.

At sunset, Jupiter, which is somewhat fainter, of magnitude minus 1.7, is almost directly south, a little to the left of Venus. Both of these planets are in the constellation of Sagittarius, the archer. Venus is approaching Jupiter, and passes it Dec. 6.

Mars To Rise in East

After midnight, at the beginning of the month, the planet Mars, which has now just reached the first magnitude, rises in the east, followed after a couple of hours by Saturn. However, Mars is approaching Saturn, and passes it at a distance about a third the apparent diameter of the full moon, on Nov. 30. By this time both rise about midnight, and the two planets, of similar brilliance and so close together, with Mars to the north, will make a most striking sight.

Probably, to the layman, one of the most puzzling things about astronomy is how astronomers find the distances of the stars and planets. Basically it is very simple, and makes use of methods similar to those often used by surveyors on the earth. Suppose, for example, that the surveyor wanted to measure the width of a river without actually going across it. To do this he would pick out two points on the same side and measure the distance between them, perhaps with a tape. Then he would take his transit instrument to each of these locations. With it he would measure the angle between some feature on the opposite side of the river—a tree, perhaps—and the other position. Thus he would be able to draw a triangle, its base the distance between the two observing posts. Since the angle made by this base with each of the other sides is known, only one triangle is possible, and

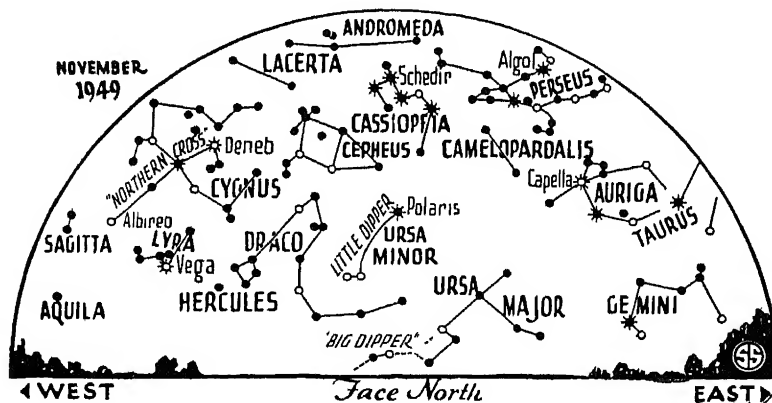
so he could compute by trigonometry, the branch of mathematics dealing with triangles, the height of his triangle, that is, the distance across the river.

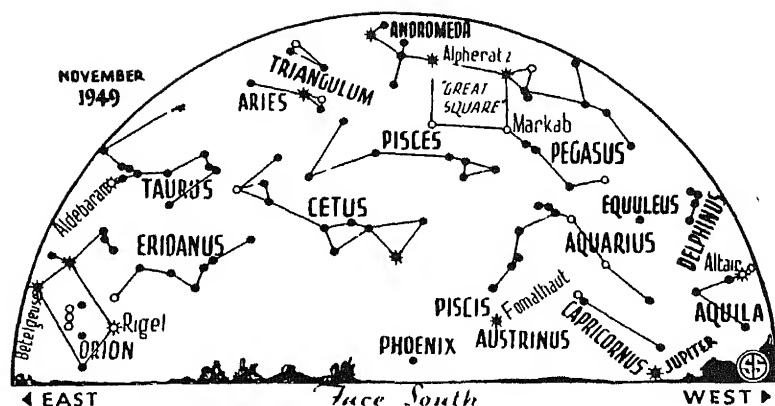
For the heavenly bodies, we need much longer baselines, which can be obtained in some cases by observing from different parts of the earth. For an astronomer in New York and another in Santiago, Chile, almost directly south, observing the moon at the same time, that body would be in slightly different directions. As seen against the background of far distant stars, the South American would observe a little farther north than his northern colleague. Thus, by measuring this shift, or parallax, as it is called, and knowing the distance between the two observatories, the distance of the moon from the earth could be found. As used by astronomers, the parallax of the moon is the difference between the directions as seen from both ends of a standard baseline equal to the radius of the earth. Since the moon's distance changes, this varies through the month.

Distance of Moon

During November, it would be at its greatest parallax, a little over a degree of arc, on the 18th. The larger the parallax, the nearer the object, so this is the date of "perigee," when the moon is nearest. Its distance is then 223,400 miles. On Nov. 3 the parallax will be 54 minutes of arc, about 10% less than one degree. This is called "apogee," when the moon is farthest, with a distance of 252,300 miles.

In angular measure there are 360 degrees in a complete circle, 60 minutes in a degree and 60 seconds in a minute. It is in seconds that we have to go in measuring the parallax of Venus, for example. On Nov. 20, when that planet is farthest east of the sun, its parallax is 13 seconds. This would be equal to a shift of one inch at a distance of about 1400 feet, rather a small amount. For the earth's radius, it corresponds to 62,955,000 miles, the distance of Venus on Nov. 20.





• • • • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS

By the time we get to the stars, the greatest distance available on the earth is much too small to produce any measurable parallax, but fortunately we have a larger baseline. If we take measurements six months apart, the earth has shifted a distance equal to twice its distance from the sun, or about 186,000,000 miles, and for the nearest of the stars this produces a small parallax. None, however, has one as large as a second.

The largest is that of a faint star in the southern constellation of Centaurus, proxima Centauri, its parallax being slightly over three-fourths of a second, equal to a distance of 25,284,000,000 miles. But since this is rather a large figure to handle, astronomers usually use other units for stellar distances. One is the light year—the space covered in a year by a beam of light, traveling 186,000 miles every second, some six trillion miles. Proxima Centauri's distance is 4.3 light years. At the other extreme are the most distant galaxies of stars that can be photographed with the new

200-inch telescope—about a billion light years away!

Time Table for November

Nov	EST	
3	1 00 p m	Moon furthest, distance 252,300 miles
5	4 09 p m	Full moon
8	3 27 a m	Algol (variable star in Perseus) at minimum
11	12 16 a m	Algol (variable star in Perseus) at minimum
13	10 47 a m	Moon at last quarter
	9 05 p m	Algol at minimum
14	7 52 p m	Moon passes Mars
15	8 31 a m	Moon passes Saturn
16	early a m	Leonid meteors visible
	5 54 p m	Algol at minimum
18	9 00 p m	Moon nearest, distance 223,400 miles
20	2 29 a m	New moon
	1 00 p m	Venus farthest east of sun
23	2 10 p m	Moon passes Venus
24	7 38 a m	Moon passes Jupiter
27	5 01 a m	Moon in first quarter

Subtract one hour for CST, two hours for MST, and three for PST

Science News Letter, October 29, 1949

ETHNOLOGY

Clue to Vanished People

See Front Cover

► **DIGGING** in the hard ice of a bleak, uninhabited island in the far north within the Arctic Circle, scientists have found a drawing made by an unknown artist some 500 years ago which shows that once a vanished people lived there. The island is Cornwallis Island in the Canadian Arctic Archipelago.

The drawing, made on a snow knife used for cutting snow blocks for building temporary snow houses, shows five men in an "umiak" a typical Eskimo boat. The men are on a whale hunt. This is made clear by the fact that one in the bow is shown in the act of throwing a harpoon into a whale. The whale is also shown. The find was made this summer by Dr. Henry B.

Collins, Jr. of the Smithsonian Institution, assisted by J. P. Mitchen of the National Museum of Canada.

Times must have changed weather conditions because now there are no whales near the island to hunt and no men to hunt them. The scientists believe that a change has occurred in ice conditions in the past 500 years which altered the direction of ocean currents.

The currents washed a considerable amount of driftwood to the island. This is shown by finds of articles such as weapon handles and boat frames made of wood. No wood reaches Cornwallis Island in these days.

The vanished people are believed by the ethnologists to be of the "Thule culture," ancestors of some of the present-day Eski-

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mos The Thule people made their way across Arctic Canada to Greenland during the course of several centuries

These people who once lived on Cornwallis Island lived in small villages of ten or a dozen houses. They built permanent homes with stone walls and floors and

having roof supports and beams of whale bone

Some were evidently accomplished primitive artists. In addition to the interesting view of the whale hunt, drawings of caribou and geese were found

Science News Letter, October 29, 1949

MINERALOGY

U. S. Manganese Process

➤ IMPROVED processes for obtaining manganese for steel-making from domestic low-grade ores give promise of freeing America from dependence upon foreign supplies, particularly from Russia

Importations from all sources now total over 1,500,000 tons a year, and the domestic production is very small. Modern steels can not be made by known methods, except at greatly increased cost, without manganese. In prewar days, the principal source of manganese for American steel-makers was Russia. Now large quantities are obtained from India and Africa

A process for recovering manganese from low-grade ores by leaching with waste pickle liquor, which is produced in large volume in certain steel manufacturing operations, was revealed recently by Richard D. Hoak, Mellon Institute, and James Coull of the University of Pittsburgh. A high-grade manganese concentrate can be recovered from the leach liquor

The ore is ground to a fine size, then treated with the waste pickle liquor, the mixture being agitated. Some 95% of the manganese is extracted in a 15-minute period. After filtration, the filtrate is treated with calcium chloride. Calcium sulfate is filtered off. The filtrate from this operation is treated with pulverized high-calcium limestone to separate the iron in it. After the hydrated iron oxide is filtered off, the filtrate is treated with high-calcium lime to precipitate the manganese. The result is hydrated manganese oxide

The oxide ores of manganese are by far the most important commercially, Messrs. Hoak and Coull stated. The materials now

used in steel-making are largely ferromanganese, spiegeleisen and silicomanganese. The action in steel-making is both as a deoxidant and as an alloying element. As an alloying element, manganese imparts desirable physical properties to a wide range of commercial steels

A great deal of research has been devoted to the development of processes for utilizing low-grade manganese ores. America has an abundant supply. Dependence on imported high-grade ore from distant parts of the world in times of great emergencies is highly hazardous. Manganese is rated in the United States as a strategic metal. Manganese ore-dressing methods constitute a major project of the U. S. Bureau of Mines

Science News Letter, October 29, 1949

MEDICINE

Dramamine Relieves Migraine and Nausea

➤ DRAMAMINE, the new drug that both prevents and relieves seasickness, may help patients with migraine headaches and mental patients with nausea after electric shock treatments

This possibility appears in satisfactory results with the drug for both conditions reported by Dr. Edward F. Keiman of Baltimore to the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Oct. 15), in Chicago, Ill.

The migraine-relieving effect was discovered accidentally. The father of one of the patients getting electric shock treatment was a long-time migraine sufferer who

usually had some nausea with his headaches. One day he decided to try for his migraine attack one of the dramamine pills given his daughter.

"He claimed that the migraine was relieved completely and rapidly," reports Dr. Keiman, who then decided to try it on eight other migraine patients.

Every one reported benefit from it. Since there were no control studies with mock dramamine pills and the number of both kinds of patients is small, Dr. Keiman says his report is "preliminary" but that he feels other physicians should know of his experiences with the drug.

Science News Letter, October 29, 1949

PHYSICS

"Radiac" Set for Disaster Use Is Being Produced

➤ RADIATION detectors for disaster use in atom-bombed areas, where the amount of radiation would swamp a Geiger counter, are now being produced commercially for use by military and civilian defense organizations, the Department of the Army announced in Washington, D. C.

Designed specially for field use with disaster levels of radiation, and able to withstand rough shocks, the detector is a result of the atomic bomb tests in the Pacific

The "radiac" set, standing for "radioactivity detection, identification and computation," will be used in training troops to survey areas and compute radiation dangers that would be left after atomic bomb blasts

The instrument, covered with a steel case, is only 10.5 inches long and weighs 10 pounds. It consists of a gas-filled chamber, known as an ionization chamber, in which are two electrodes. When carried into "hot" areas dangerous gamma rays, the most penetrating type of radiation, go through the steel cover and knock electrons from the atoms of gas in the ionization chamber, making the gas slightly conducting. A weak electric current can then flow between the electrodes to show on the radiation-indicating dial.

Science News Letter, October 29, 1949

GENERAL SCIENCE

Andrade to Head British Royal Institution

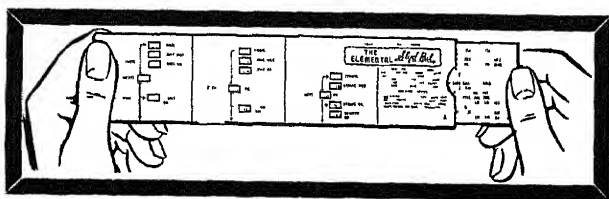
➤ PROF. F. N. D. ANDRADE will become director of Britain's historic Royal Institution, and resident professor and director of the Davy Faraday Research Laboratory on Jan. 1.

Prof. Andrade succeeds Prof. E. K. Rideal who has headed the Royal Institution since 1946.

Since 1928, Prof. Andrade has been Quain Professor of Physics at the University of London. He is a specialist on metallurgy, particularly single crystals of metals.

Science News Letter, October 29, 1949

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POPULATION

Urge British Depopulation

➤ SEND 15,000,000 Englishmen to other parts of the British empire. That is suggested as Britain's way out of her economic plight.

This solution suggested by Guy Irving Birch, director of the Population Reference Bureau in Washington, would relieve that crowded island of its large surplus population which, if not exported, is "practically certain to continue Britain's chronic crisis."

Emigration of about a third of Great Britain's population would save the American people billions of dollars in capital and natural resources, Mr. Birch claims. It would also help to build up friendly nations on at least three sides of the United States in case of war.

The surplus people that Britain can not support from the combined yields of her land, industry and foreign trade, according to Mr. Birch's plan, would be moved to thinly inhabited British areas, such as Australia, Canada and parts of Africa, at the rate of 500,000 person a year.

Pointing to Ireland and contending that the heavy emigration from that country helped raise its living level from one of the lowest to one of the highest in Europe, Mr. Birch suggests that Britain do likewise.

Because Britain's reproduction rate is just about replacing losses, every person who leaves will be helping the situation. Mr. Birch also suggests that every Englishman who moves overseas will better his own chance of getting more adequate living conditions.

Great Britain has more than two and a half times as many people per square mile as Europe and more than 11 times as many as the United States. Only Japan among all the countries of the world is more crowded than the United Kingdom. Italy, Germany and India have less than half as many people per square mile of arable land, Mr. Birch's figures show.

Britain was able to increase her population from 20,000,000 to 49,000,000 during the last hundred years on the strength of her supremacy in industrialization, trade,

naval force and foreign assets, in none of which she is now supreme.

The suggested mass migration would not be an easy job, Mr. Birch admits, but he contends that it would be cheaper to move a person once than to move some 1,400 pounds of food, plus other raw materials, every year to support that person if he remains in Britain.

Danger of both war and communism argue for the decentralization of British population. A crowded Britain just missed being staved into submission by submarine and air warfare during two wars and should not risk a third attack. Mr. Birch urges. Danger of communism in Britain is considered as serious as that of war, and hunger and social unrest are basic causes of communism, it is pointed out.

Science News Letter, October 29, 1949

ENGINEERING

Underground Aluminum Cables Used Successfully

➤ ALUMINUM-covered underground, overhead and submarine cables for the transmission of electrical power have been successfully introduced in England and Germany, the American Institute of Electrical Engineers was told at its meeting in Cincinnati by H. V. Menking of the Reynolds Metals Company, Richmond, Va. He said that investigations are being made of the possibility of using aluminum wire and cable without steel support for building wire to replace copper.

The aluminum is not suggested as a substitute for copper, but as an alternate in view of the expected increasing scarcity of the latter metal. He revealed also that transmission towers, built from aluminum and rolled or extruded shapes, are under study.

Science News Letter, October 29, 1949

METEOROLOGY

Wind Blows West Over London, Balloons Tell

➤ HIGH up over the heads of Brits, from 10 to 20 miles aloft, the winds are from the west again, after having been from the east during the summer.

This is one of the facts about the weather that can be reached through high flying giant balloons tracked by radar and carrying miniature radio broadcasting sets that report the temperature.

The Air Ministry's Meteorological Office, in studies by Dr. F. J. Scrase reported in London, finds new confirmation of earlier theories, based on the way sound of explosions is transmitted, that the direction of the winds in the extreme upper air re-

verses about in April and then turns about again in the fall.

It is not as cold 20 miles up as it is at 10 miles aloft. But it is very cold at either height by surface standards—40 degrees Fahrenheit below zero at 20 miles high and 76 degrees below at 10 miles high.

Science News Letter, October 29, 1949

Words in Science— STALACTITE-STALAGMITE

➤ THOSE beautiful fairy-like formations you see in caves are stalactites and stalagmites.

The stalactites—you say it stu-lack-ute with the stress on the lack—hang from the roof. They are lacy icicle-like formations caused by the deposit of minerals, especially calcium carbonate, from the moisture that condenses on the roof of the cave and drips down slowly.

Stalagmites—pronounced stu-lag-mites with the stress on lag—are similar formations on the floor of the cave which are built up from the drippings that fall from the stalactites overhead.

Science News Letter, October 29, 1949

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Pumpkins

➤ WHEN the first white men arrived in America, they found many things they had never seen before, including red Indians, yellow corn and orange pumpkins. Of the three the only one they treated shabbily was the first. In the lean and hungry early years of colonization, the first settlers, for preservation's sake, quickly learned to cultivate pumpkin and corn in the Indian manner.

Without benefit of county agents to tell

them about strip cropping or of the agonomic virtues of crop rotation, the Indians had developed a system of planting corn in rows. Between the rows they grew pumpkins. This practice is still followed.

Pumpkins were known in the Old World. Both Europe and Asia cultivated types of garden squash. The name pumpkin itself, with which the strange squat spherical fruit was dubbed, had been applied to a type of European yellow squash long before Columbus. It is believed originally to have been a Greek word meaning "sun-warmed" or "sun-ripened," which then went through many linguistic changes to become finally the English word "pumpkin."

Pumpkins and squashes are very closely related, both being members of the gourd family. The word squash is adapted from an Indian word. Some of the more familiar types are crookneck squash, scallop or acorn squash, and Hubbard squash.

However this is all academic. Comes the fall of the year and all botanical distinc-

tions vanish. From Hallowe'en to Thanksgiving there is but one gourd, and pumpkin is its prophet. Nothing is more American than to place a tallow candle in a hollow pumpkin on the hallowed eve. The familiar cut-out mask flickers with a benign grotesquerie. And if the pumpkin be real and not store-bought cardboard, and if mother still practices the arts her mother taught her, from the kitchen comes the incomparable fragrance of flesh-baked pumpkin pie.

Outside, the man of the house, paint brush in hand, regards his front gate with satisfaction. If the hobgoblins who last year put his gate on the garage roof try it again this year, they will get paint on their hands for their trouble. He turns and walks to the house. He sees the lighted pumpkin in the window and he smells the unmistakable aroma from the kitchen. He quickens his step, smiling to himself. And the flickering pumpkin-face seems to be smiling too.

Science News Letter, October 29, 1949

ENGINEERING

TV Noise Is Man-Made

➤ THE "noise" that interferes with the performance of television reception is largely "man-made" and most of it can be eliminated, the American Institute of Electrical Engineers was told in Cincinnati by George D. Hulst, of Allen B. DuMont Laboratories, Passaic, N. J.

These noises come from automobile ignition, gas-filled illumination sources, motor and generator commutators, gaseous rectifiers, elevator relays and other electrical installations. These are impulse noises of short duration.

Less common is noise of long duration, including those that originate at a fixed industrial location, including automatic furnaces and refrigerators. Then there is the continuous or single frequency noise of diathermy machines, "ham" transmitters and home-made television sets. To these may be added the random or thermal noise which originates in vacuum tube apparatus, such as industrial radio frequency heating units or super-regenerative radio receivers.

The noise is not picked up entirely in the antenna, Mr. Hulst stated. It may be picked up in lead wires, the antenna post, the signal frequency circuits, the intermediate frequency amplifiers, and in some cases even by the video amplifier.

Pick-up of interfering signals can be avoided if the lead-in wire is coaxial rather than being unshielded open wires. Antenna connector posts also can be coaxial, the outer conductor being grounded to the chassis and the inner conductor having a high frequency choke connected directly to the chassis. Pick-up within the chassis can be helped considerably by the use of well-known electrostatic shielding in the receiver generally.

Much in television reception depends upon the installation man. He must orient the antenna in such a way as to minimize the noise of long duration. His installations and tests should be made when nearby factories are in operation, particularly those that use equipment that cause interference.

Science News Letter, October 29, 1949

METALLURGY

New Corrosion Protection Is Patented

➤ AN ALUMINUM-ON-STEEL combination, with the light metal or its alloys serving as a protective coating against corrosion, gives promise of wide usage with a newly patented bonding process on which the government has issued patent 2,484,118 to Richard S. Reynolds of Richmond, Va.

This new method of coating aluminum on steel makes a permanent bond, it is claimed, by use of a fine iron coating on the steel deposited electrolytically as a bonding agent. Older methods of applying aluminum to steel by dipping the steel in molten aluminum obtained an unsatisfactory bond.

In this new method, which has been assigned to the Reynolds Metals Company of Richmond, steel strip from a roll is passed in a continuous process through a cleansing bath, the electrolytic bath to receive the iron coating, a furnace to heat it to about 850 degrees Fahrenheit, then between two strips of aluminum foil between high-pressure rollers where the bonding is effected. The plated steel can then be further rolled to reduce its thickness.

Science News Letter, October 29, 1949



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Books of the Week

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ABRAHAM LINCOLN ANNIVERSARY VOLUME—Studies in Pediatrics and Medical History—Solomon R. Kagan, Ed.—*Troben Press*, 365 p., illus., \$6.00. A compilation by leading authorities of material in the fields of pediatrics, pediatric neuropsychiatry and medical history.

ADVANCES IN CARBOHYDRATE CHEMISTRY, Vol. 4—W. W. Pigman and M. L. Wolfrom, Eds.—*Academic*, 378 p., \$7.80. Contributed by 14 specialists in various fields.

AIR POLLUTION IN DONORA, PA. Epidemiology of the Unusual Smog Episode of October 1948—H. H. Schrenk and others—*Gout Printing Office*, 173 p., illus., paper, \$1.25. The information needed for preventing such an occurrence as the Donora tragedy in your community.

AMERICAN SPIDERS—Willis J. Gertsch—*Van Nostrand*, 285 p., illus., \$6.95. Describing the life and habits of these interesting creatures. Beautiful photographs, many in color, add to the interest of the book.

APPLIED EXPERIMENTAL PSYCHOLOGY—Alphonse Chapanis, Wendell R. Garner, Clifford T. Morgan—*Wiley*, 434 p., illus., \$4.50. A textbook with the objective of showing how machines can be more efficient by being designed to suit the psychological make-up of the human operator.

THE BOYLSTON STREET FISHWIRE II. A Study of the Geology, Palaeobotany, and Biology of a Site on Stuart Street in the Back Bay District of Boston—Elso S. Barghoorn and others—*Phillips Academy*, 133 p., illus., paper, \$2.00. Intensive study of a site uncovered in the course of construction of the John Hancock Insurance Building.

CHILD BIRTH. Your Questions Answered—Carl Henry Davis and Donita Ferguson—*Harper*, 183 p., \$2.50. Answers many questions which arise in the minds of mothers-to-be.

COMING OF AGE IN SAMOA—Margaret Mead—*New American Library*, 192 p., paper, 35 cents. A study of adolescence and sex in primitive societies originally published by Morrow.

EXCAVATIONS IN NORTHEASTERN MASSACHUSETTS—Ripley P. Bullen—*Phillips Academy*, 152 p., 20 pl., paper, \$2.00. Report of the excavation, test and survey of Indian sites in the Shawshin River Valley and neighboring territory.

THE FLOWER ARRANGEMENT CALENDAR 1950—Helen Van Pelt Wilson—*Barrows*, 52 p., illus., \$1.00. Flower lovers will take delight in this engagement book with, for each week, a lovely photograph of a different flower arrangement.

GREEN GLORY. The Forests of the World—Richard St. Barbe Baker—*Wyn*, 253 p., illus., \$3.50. A readable guide to the trees that "with the help of all plant life, controls the food supply and life of man and of the animal kingdom."

CHEMICAL ACTIVITIES OF FUNGI—Jackson W. Foster—*Academic*, 648 p., illus., \$9.50. Intended to orientate a non-specialist in the field, this book is timely now that fungi are very much a part of the industrial world and

have gained new importance through the discovery of antibiotics.

HOT-TINNING. Practical Instructions for Hot-Dip Tinning Fabricated Articles and Components—W. E. Hoare—*Tin Research Institute*, 112 p., illus. Free upon request to publisher, 492 West Sixth Ave., Columbus 1, Ohio. A practical manual of British origin.

IRIS FOR EVERY GARDEN—Sydney B. Mitchell—*Barrows*, 224 p., illus., \$3.00. Complete directions and how-to drawings which the amateur needs. Colored photographs included.

JUST FOR TWO COOKBOOK—Lily Haxworth Wallace—*Barrows*, rev. ed., 322 p., \$2.50. Intended for brides, this book includes information on how to furnish your kitchen and suggestions on what to serve.

THE MARKET FOR COLLEGE GRADUATES AND RELATED ASPECTS OF EDUCATION AND INCOME—Seymour E. Harris—*Harvard University Press*, 207 p., illus., \$4.00. Discussing the problem of the college graduate's occupational outlook.

MATHEMATICS DICTIONARY—Glenn James and Robert C. James—*Van Nostrand*, rev. ed., 432 p., illus., \$7.50. Contains terms, symbols, and concepts used in pure and applied mathematics, science, commerce and industry.

METALLIC CREEP AND CREEP RESISTANT ALLOYS—A. H. Sully—*Interscience*, 275 p., \$5.50. Presented from the point of view of both industrial and academic worker.

METALS REFERENCE BOOK—Colin J. Smithells, Ed.—*Interscience*, 734 p., \$13.50. Useful data in the form of tables and diagrams with accompanying bibliographies.

MOBILIZATION OF THE HUMAN BODY—Harvey E. Billig, Jr. and Evelyn Loewendahl—*Stanford University Press*, 65 p., illus., \$2.00. A manual of physical exercises.

MOST OF THE WORLD—Ralph Linton, Ed.—*Columbia University Press*, 917 p., illus., \$5.50. Articles by 14 leading social scientists on non-European lands and their main developments.

ORGANIC CHEMISTRY—G. Bryant Bachman—*McGraw-Hill*, 432 p., illus., \$4.25. A text for a full year's course in organic chemistry, especially aimed at those who do not intend to become chemists.

PROGRESS IN METAL PHYSICS I—Bruce Chalmers, Ed.—*Interscience Publishers*, 401 p., illus., \$9.50. Presenting authoritative reviews in specialized aspects of the field that includes both physical metallurgy and metal physics.

RADIO TECHNOLOGY. Telegraphy, Telephony, Television, Transcription, Facsimile—Ernest J. Vogt—*Pitman*, 556 p., illus., \$6.00. Something between an operator's instruction book and engineer's text, this work attempts to provide all material for FCC license examination.

RELIGION AND RACE BARRIERS TO COLLEGE?—A. C. Ivy and Irwin Ross—*Public Affairs Committee*, 32 p., illus., paper, 20 cents. Based on impartial studies made by the American Council on Education and several state agencies.

TERRESTRIAL MAGNETISM AND ELECTRICITY—J. A. Fleming, Ed.—*Dover*, 794 p., illus., \$4.95. Including chapters on magnetic pros-

pecting, radio exploration of outer atmosphere, thunder clouds and their electrical effects and many others. One of the NRC Physics of the Earth series, No. VIII.

Science News Letter, October 29, 1949

ASTRONOMY

Exploding Star Discovered—Nine Years Later

► AN exploding star or nova that flashed and dimmed out nearly a decade ago is the latest astronomical discovery announced to the American Association of Variable Star Observers meeting at Harvard Observatory, Cambridge, Mass.

A Dutch astronomical student, C. J. Van Houten, found the new star on a photograph taken at Leiden Observatory in April, 1940, just before Hitler invaded Holland. Nova Velorum rose to 9th magnitude and then returned to the obscurity of a very faint 16th magnitude or less. The discovery was checked on plates taken by the Harvard Observatory.

The nova is named after its location in the obscure Vela constellation (meaning the sails) which is low on the southern horizon from northern latitudes. Its position is 8 hours 55 minutes right ascension and south 52 degrees declination.

Science News Letter, October 29, 1949

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⚙️ **ELECTRIC LUNCH BOX**, plugged into a factory or office electric outlet, provides both a steaming hot lunch and cold dessert. Besides two containers for food, it has a bottle for hot beverages. It is available also with voltage units for use in automobiles, trucks, boats and trains.

Science News Letter, October 29, 1949

⚙️ **OIL CAN**, recently patented, is made of rubber and pressure on its sides forces the lubricant out the spout. The spout is flexible and can be bent to reach into restricted areas. A valve in the spout keeps out foreign matter when the can is idle.

Science News Letter, October 29, 1949

⚙️ **SOUP DISPENSER** and alcohol dispenser, for use in hospitals and other places where hands must be clean and aseptic, operate automatically by an "electric eye." When a hand cuts a beam of light shining on a photoelectric cell, a squirt of the contents of the dispenser is discharged.

Science News Letter, October 29, 1949

⚙️ **PHOTOGRAPHIC ENLARGER** for use by professionals or amateurs, shown in



the picture, is a relatively efficient, economical type that uses a hollow sphere with a lamp burning inside. The white paint inside the sphere reflects and re-reflects the rays until the light is completely integrated, or evenly distributed.

Science News Letter, October 29, 1949

⚙️ **EGG COATING APPARATUS**, for applying a coat of wax to dirty eggs in an egg-processing plant before the shells are broken, is an inclined plane down which the eggs roll while passing through a spray. The coating applied by this recently patented device prevents contamination in the egg-opening process.

Science News Letter, October 29, 1949

⚙️ **INSULATING SPACERS**, for use in high frequency electrical applications requiring top performance, are made of the plastic polytetrafluoroethylene and are fashioned in the various forms required. Their loss factor, dielectric constant and dielectric strength do not vary with temperature change below 400 degrees Fahrenheit.

Science News Letter, October 29, 1949

⚙️ **IRRIGATION HOSE**, to carry water to farm crops, is made of glass fiber coated with resin, and comes in 100-foot lengths from four to 16 inches in diameter. Each 100-foot length of the 10-inch size weighs 45 pounds. Each section of this flexible main line hose is equipped with a tee for the attachment of a distribution hose.

Science News Letter, October 29, 1949

Do You Know?

White light penetrates fog just as well as colored light.

Among the Oriental tobacco-raising countries, Turkey ranks first.

Sesame is one of the most promising of the new oilseed crops for America.

Well-managed forests on watersheds can conserve water supplies, help reduce floods, and regulate stream flow.

The great number of roots in a nearby river gave the city of Racine, Wisc., its name; racine means root in French.

Wisconsin has a right to the title "Land of Lakes," within its boundaries are 8,289 lakes, 3,747 of which have an area of over 10 acres.

Turkey, with about 19,000,000 people and area of some 190,000,000 acres of which 73% is cultivable, has great agricultural possibilities, only 20% of its cultivable land is now in field or tree crops.

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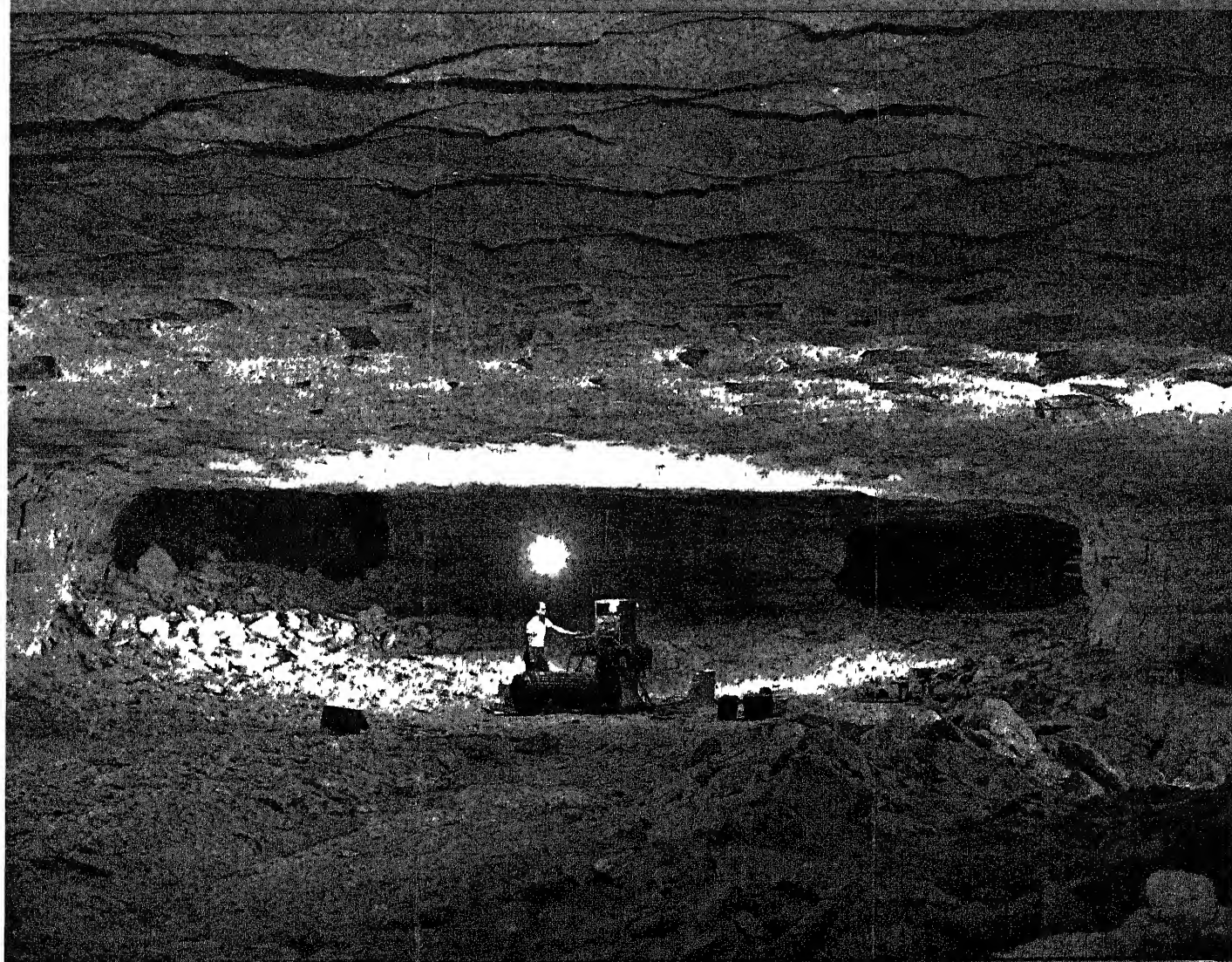
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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



Unearthing Cosmic Rays

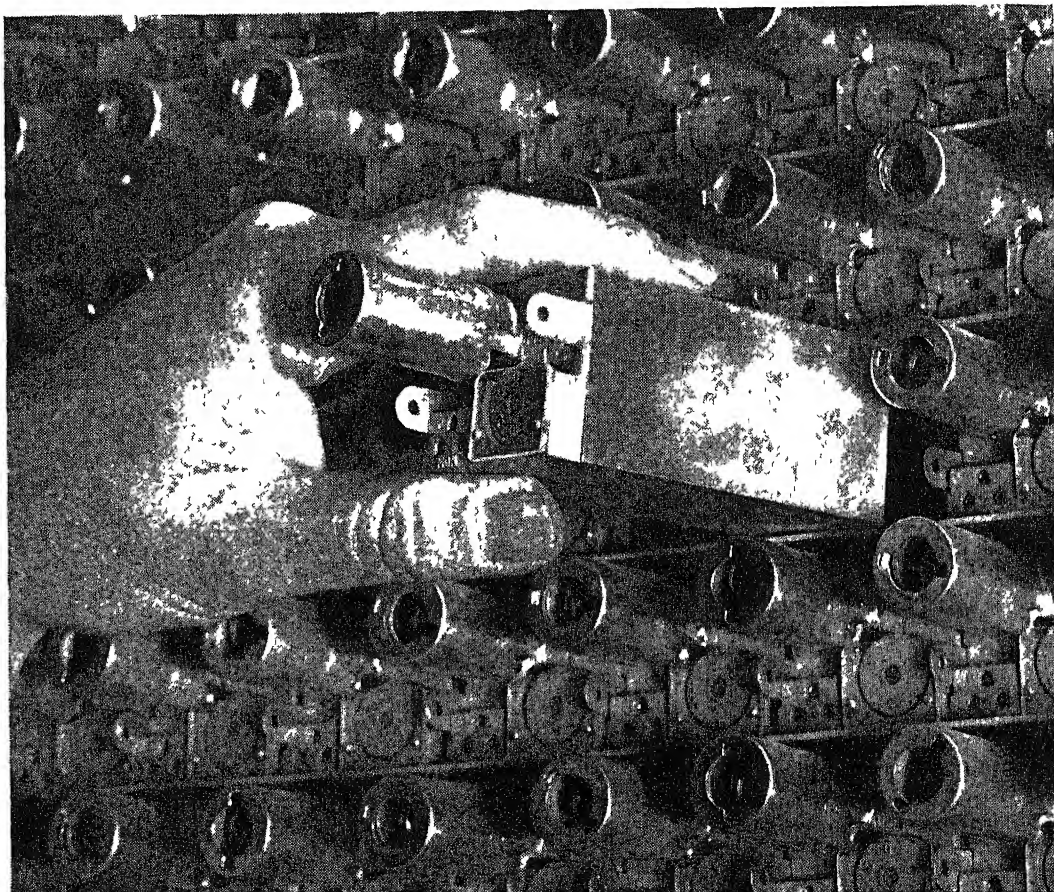
See Page 192

New Data

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VOL. 56 NO. 19 PAGES 229-304



ANOTHER SCORE IN THE

battle of the inches

It takes many costly buildings to house your telephone system. Every inch saved helps keep down the cost of telephone service. So at Bell Telephone Laboratories engineers work constantly to squeeze the *size* out of telephone equipment.

In the picture a new voice frequency amplifier is being slipped into position. Featuring a Western Electric miniature vacuum tube, tiny permalloy transformers, and special assembly techniques, it is scarcely larger than a single vacuum tube used to be. Yet it is able to boost a voice by 35 decibels. Mounted in a

bay only two feet wide and 11½ feet high, 600 of the new amplifiers do work which once required a *room* full of equipment.

This kind of size reduction throughout the System means that more parts can be housed in a given space. Telephone buildings and other installations keep on giving more service for their size — and keep down costs.

The new amplifiers, which will soon be used by the thousands throughout the Bell System to keep telephone voices up to strength, are but one example of this important phase of Laboratories' work.

BELL TELEPHONE LABORATORIES *Exploring and Inventing, Devising and Perfecting, for Continued Improvements and Economies in Telephone Service*



MEDICINE

Pills To Ward Off Colds

Anti-histamine chemicals, used for many allergy conditions, are now claimed effective in checking colds. They are available without prescription.

➤ **WARDING** off a cold by taking a pill when you first feel the symptoms of a cold coming on is the promise now held out by drug manufacturers and by research reports, published and unpublished, from various parts of the country.

The pills which it is hoped will do this job of stopping the common cold, with its annual bill of billions of dollars and hundreds of millions of lost working days, will contain chemicals known as anti-histamines.

Results with up to 90% success in treating colds by these chemicals have been reported, and reports of even better results are about to appear.

The anti-histamines have been used to treat hay fever, asthma and other allergic, with both good results and failures reported. Until recently they have been sold only on a doctor's prescription. Two months ago (Sept. 2) one of them, with the trade-name of Neohistamine, was released for sale over the counter, without prescription, under the name, Anahist. Last month another of them, named Inhiston, went on sale over the counter.

Probably many others will be available this way within the next few months, since there are many anti-histamine chemicals made by different manufacturers. All of them doubtless will rush to file with the U. S. Food and Drug Administration new or amended new drug applications for over the counter sale of their products.

The American people may become cagey guinea pigs this winter in large scale trials of some of these drugs, both as to the effectiveness and safety. Most of what has been known of the anti-histamine drugs so far has come from reports of their use in hay fever and other allergies.

Two limiting factors, one potentially dangerous, have shown up in the allergy studies with the drugs. These are: 1. The same drug that gives relief to one hay fever patient is ineffective in another, and there is no way of knowing without trying the drugs which will be effective in which patient. Whether this will be true in the use of the drugs for warding off colds has not yet appeared.

2. Drowsiness has been the chief unpleasant symptom coming from the use of anti-histamine drugs. This symptom has seemed to affect some patients more than others. It may range from mild to the serious state where sleep would overcome a person while driving a car or operating machinery, with consequent danger to the person taking the drug and to others.

The anti-histamine drugs now released

for over-the-counter sale for colds are said to have little or none of this effect in the amounts contained in the pills, if used according to directions.

Basis for use of anti-histamine drugs in treating colds is the relatively new idea that a cold is an allergic response to the protein of the cold virus, somewhat as hay fever is an allergic response to the protein of plant pollens. Release of too much of the normal body chemical, histamine, in some persons, in response to the protein, is believed the cause of the symptoms in hay fever and, according to the new theory, in colds. Anti-histamine chemicals should control or stop the symptoms by counteracting the histamine.

Science News Letter, November 5, 1949

ENGINEERING-AERONAUTICS

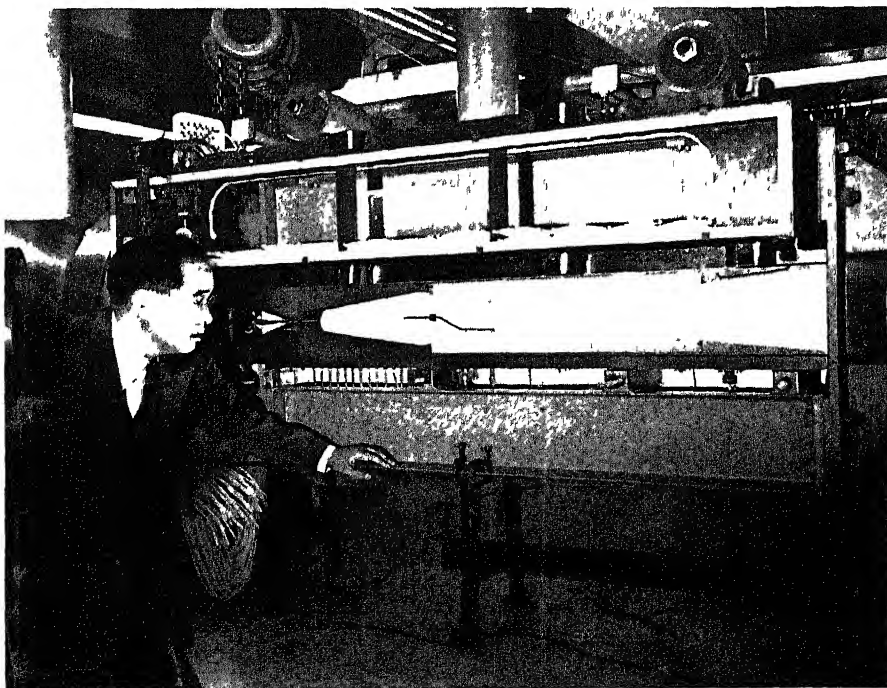
Hypersonic Wind Tunnel

➤ **THE** highest air velocity in a wind tunnel, ten times the speed of sound or approximately 7,600 miles per hour, is attained in a new tunnel now completed at the California Institute of Technology, Pasadena, Calif. It was designed and built for the Army Ordnance Department.

Previous highest known speed of air flow in supersonic wind tunnels was about seven times the speed of sound. This tunnel is needed by ballistic experts of the Army to develop guided missiles of extremely high speed. It will be used in studying what they call the inevitable intercontinental missiles of the future.

An early use of this so-called hypersonic tunnel will be to obtain basic information about the design, performance and instrumentation of tunnels for extreme high speeds. Basic experimental data on shockwaves, boundary layers and the flow past models at hypersonic speeds will be obtained.

The test section of this tunnel, in which models of missiles are mounted, is five by five inches in size, although the entire test section stretches to an over-all length of four feet. To accelerate in the expansion section of the tunnel, air must pass through a slot in the throat of a specially designed



WORLD'S FASTEST WIND TUNNEL—Unprecedented speed in excess of ten times that of sound has been obtained in this wind tunnel. Dr. Henry T. Nagamatsu, Caltech director of the tunnel, is shown examining the test section.

steel alloy nozzle. A schlieren optical system is used to photograph the fast moving air as it speeds past the models in the test section.

The new tunnel is installed in the Gugenheim Laboratory of Aeronautics on the campus of the Institute in a building espe-

cially designed for it. A total of 15 compressors supply the air for the tunnel. The tunnel was designed by Dr. Allen E. Puckett, and will be operated under Army Ordnance contract by Dr. Henry T. Nagamatsu of the laboratory staff.

Science News Letter, November 5, 1949

ARCHAEOLOGY

Indians' Increase Traced

► THE ancient inhabitants of the Flagstaff, Ariz., area, who disappeared about 600 years ago, were once almost as numerous as the population today, thanks partly to a volcano which erupted beneficial water-retaining ash over a wide farming area.

Today there are about 10,000 people living in the area. In the year 1160 A.D. the vanished Indians reached an estimated peak of 8,416. Ninety years later the population had dropped to a mere 612, and a hundred years after that, in 1350, the pueblo dwellers had completely disappeared.

The rise and decline of the Flagstaff area prehistoric residents have been traced in their pottery remains by Harold S. Colton, president of the Northern Arizona Society of Science and Art. The ceramic record goes back to the year 500 A.D. when the population was 300. The rise was more or less slow until the year 1167 when volcanic ash falling from Sunset Crater suddenly increased the agricultural capacity of the area. The ash formed a black sand mulch which held the moisture in the soil.

The cause of this rapid decline from the high point of population, Dr. Colton believes, was poor sanitation and faulty agricultural methods which ruined the arable land.

To arrive at such precise figures and dates, Dr. Colton believes that "the archaeologist must have courage enough to take his feet off the concrete and soar into the

sky of speculation." His method, which is similar to the one he employed in an earlier study in 1936, is first to assign dates to the pottery which has been recovered from some 1,500 sites in the area. These dates are fixed with considerable accuracy by the tree ring method.

Then by estimating the number of inhabitants per pueblo or pit house for each time sequence, he draws up a population census which shows the slow climb to peak population and then the sudden drop into extinction.

Science News Letter, November 5, 1949

GENERAL SCIENCE

Scientists in U.S. and Europe on Equal Terms

► AMERICAN scientists are on about equal terms with their European counterparts as far as fundamental work is concerned, Dr. Robert H. Kriebel of the General Electric Research Laboratory declared.

Returning from a European trip during which he inspected technical and scientific activities, Dr. Kriebel declared that "European scientists are unusually original and imaginative, but are hampered by lack of suitable facilities." Scientists here lead the world in the application of technical knowledge, he noted.

Science News Letter, November 5, 1949

Question Box

ASTRONOMY

What may comet dust reveal? p. 294

GEOLOGY-NUCLEAR PHYSICS

On what is the theory that the earth is getting warmer based? p. 294

MATHEMATICS-ENGINEERING

How could a "fail-safe" mechanical librarian be developed? p. 295

MEDICINE

For what discoveries was the Nobel Prize in medicine awarded? p. 295

Photographs: Cover, Cornell University, p. 291, California Institute of Technology, p. 293, Signal Corps Engineering Laboratories

What disease increases under poor housing? p. 297

What kinds of pills are offered to ward off colds? p. 291

NUCLEAR PHYSICS

How could the existence of a negative proton be discovered? p. 293

PHYSICS

What unique kind of plastic film has been developed? p. 296

On This Week's Cover

► COSMIC ray particles which smash deep into the earth from outer space will be studied in this worked-out cavern 2,250 feet underground in the Cayuga Rock Salt Company's mine near Ithaca, N. Y. Lowell M. Bollinger of Cornell University is shown checking a cylinder of 48 Geiger counters and other cosmic ray recording apparatus in preparation for the experiment.

Science News Letter, November 5, 1949

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NUCLEAR PHYSICS

Missing Particle Sought

Theory of the existence of a negative proton is based on the orderliness of nature as shown in the case of positive and negative electrons.

► **WANTED** A missing atomic particle, the negative proton

This missing particle look-out was broadcast by Drs. Julius Ashkin, Theodore Auerbach, and Robert E. Marshak, University of Rochester physicists, at the meeting of the National Academy of Sciences in Rochester, N. Y.

Because there are both positive and negative electrons, although only positive protons are known so far, the scientists suggest nature, to be symmetrical, should also have a negative proton. Such a particle might be detected by exposing photographic plates to cosmic rays at very high altitudes reached by balloons.

"Electrons have been known for a long time to exist in two different varieties of the same mass but opposite charge," the report said. "The more abundant electron has a negative charge and is found in atoms, in the region close to but primarily outside the central nucleus. The less abundant positively charged electron is not a permanent constituent of the atoms as we know them but is produced in a variety of processes taking place in the nucleus or in the immediate surrounding region."

"When brought into close proximity the two may disappear or be annihilated in a single act, producing simultaneously two quanta of light. Thus a positive electron in the presence of matter containing negative electrons has only a transitory existence and eventually suffers annihilation."

"Protons so far found in nature are all of one variety. These particles, which form one of the fundamental constituents of nuclear matter, are of positive charge and of mass approximately 2,000 times the mass of an electron. They have in common with electrons the feature of possessing an intrinsic spin or angular momentum equal to one half a natural unit. This numerical identity in the spin has long since led to

speculation on possible further analogies between electron and proton. It is of interest to find out if a negative proton exists."

"A negative proton would be a particle of negative charge, of mass equal to that of an ordinary positive proton and capable of undergoing an annihilation process with the more abundant positive proton. For this type of annihilation process one finds by theoretical estimation that the most likely end products are two new charged particles known as mesons."

"The charge on these resulting mesons make their detection possible by the now standard technique of examining nuclear events in very sensitive photographic emulsions. Since the positive proton which is one of the partners in the annihilation event forms a part of the nucleus of an atom in the emulsion there will also be other charged particles emitted as a result of the shock of the annihilation. The mesons, however, will be moving with much greater speed than the emerging nuclear constituents and will leave noticeably different tracks, thinner than usual, in the photographic emulsion. One would therefore expect to find an explosive event in the emulsion which starts with the entry of a very fast charged particle, the negative proton, and results in the production of only two fast moving charged particles, which are mesons, accompanied by some number of slowly moving charges."

"Because of the necessity to conserve momentum in the annihilation event the three fast tracks would all lie in the same plane forming an inverted Y-shaped figure with the angle between the two mesons somewhat greater than 90 degrees on the average. If this characteristic phenomenon were found in photographic plates we would have evidence for the existence of the negative proton."

Science News Letter, November 5, 1949

METEOROLOGY

Radar Spots Coming Storm

► **STORM** areas six to eight hours away may be detected by special radar equipment mounted atop a 100-foot tower at the Army Signal Corps engineering laboratories, Fort Monmouth, N. J. This new radar is designed to give weathermen and pilots warning of storms within a 200-mile radius.

The detection of storm clouds far beyond

normal vision by radar is not new. That such clouds will reflect radar pulses back to the transmission antenna of the radar equipment, which also acts as a receiver, was first noticed by observers on radar-equipped B-29s en route from Pacific islands to bomb Japan during the war. Since then radar has been used both by military



RADAR WEATHER TOWER—
Advance storm warning is obtained by this detector at the Signal Corps Engineering Laboratories, Fort Monmouth, N. J.

and civilian weathermen in studies of weather movements and in forecasting.

Tower-mounted, this new installation has a wider range than other ground-based equipment but, more important, the equipment used has been arranged to accentuate the storm signals and to permit their detection at relatively great distances. Earlier radars had a tendency to pick up signals from nearby rainstorms, thereby masking indications from enemy targets on the far side of such storms.

This apparatus consists of a high-power transmitter, a large eight-foot parabolic antenna, and a sensitive radar receiver. The signals received from any storm area within range of the radar can be displayed on several types of oscilloscopes which contain cathode ray tubes similar in appearance to those on television receivers. The signals can "paint" electronically a picture similar to a relief map of the area or give a vertical cross-section of the storm.

In both cases the radar set introduces its own "scale of miles" on the map so that the operator can quickly and simply estimate the distance of the storm from his station. Satisfactory operational tests have already been made with the new installation.

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Electric generators at Grand Coulee Dam in Washington state will have a combined capacity of 2,000,000 kilowatts when all 18 are installed, 10 are already in use.

About 60% more turkey poulters were hatched in the United States this year than in 1948, which means that turkeys should be plentiful for the coming holiday markets.

GEOLOGY-NUCLEAR PHYSICS

Earth Is Getting Warmer

Contradiction of the theory that the earth is cooling off is based on the amount of radioactivity measured in meteorites.

► **CONTRARY** to the popular belief that the earth is cooling off, it actually is warming up.

Dr Harold C Urey, University of Chicago distinguished service professor of chemistry and Nobel-prize winner, advanced a new theory on the origin and development of the earth at the meeting of the National Academy of Sciences at Rochester, N Y. His "warming-up" hypothesis is based on the amount of radioactivity measured in meteorites.

Heat at the earth's center is generated in part by the dropping of the metallic components toward the center, but largely by radioactivity. Since it is impossible to penetrate far enough into the earth's center to determine the heat, the temperature has been calculated by measuring the radioactivity of meteorites, which are believed to be similar to the earth's core.

The earth was formed, according to Dr Urey's chemical hypothesis, from a conglomerate of metallic iron and rock. The iron, melted by the heat during a period of more than a billion years, fell to the center of the earth to form the earth's core.

The earth's crust, affected by this phenomenon, was formed into mountain ranges. As more metal moves from the outer crust to the earth's core, at intervals of approximately 200,000,000 years according to Dr Urey's estimates, other mountain ranges will be formed.

The more common belief on the development of earth, had been that the iron of the earth sank to the center while the earth was very hot. It was believed that the iron formed the core of the earth and the solidification of the crust of the earth began from the core outwards, with convection in the molten earth being the effective means for the transfer of heat.

"If radioactivity found in the surface rocks is representative of an average sample of the whole earth," Dr Urey said, "comparatively rapid heating of the earth must result."

Rough calculations show, he points out, that the gravitational energy stored which would be dissipated in the formation of the present core of the earth is greater than the radioactive heat that has been generated in two billion years from all radioactive materials. The iron flowed to the center of the earth through channels opened by the wetting of the stone phase by the iron phase, generating a large amount of heat. This leads to convection in the outer mantle

of the earth and the formation of mountains.

Metallic iron also played an important role in the formation of the earth's atmosphere and similarly in determining the atmospheres of Mars and Venus according to the Nobel-prize winner.

With a somewhat lower temperature for Mars and a somewhat higher temperature for Venus, he accounts for the water and carbon dioxide supplies of the minor planets.

Dr Urey also accounts for the difference in density of the moon and earth by postulating a decreasing temperature between the beginning and final phases of the formation of the earth and her satellite so that iron was not in the initial preplanetary

cloud but was present in the final cloud. Earth, 80 times larger than the moon, accumulated the iron particles faster than the moon.

The hypothesis of the metallic state leads to an initial structure of the earth with a core of moon-like material surrounded by a layer of silicate and iron phase.

The core did not move for some billion years until the radioactive heat melted the iron and decreased the solidity of the silicates of the original solid earth.

Dr Urey suggested that the primordial core rose to the surface during the Pre-Cambrian times (more than one and a half billion years ago) and first produced continental land and probably the Pacific basin, and now forms the outer iron core-mantle of earth some 230 miles thick.

The iron of the primordial mantle moved to the interior, producing increased temperatures at depth which generated convection currents, which have produced folded mountains, continental drift and glacial periods. The same phenomena, he believes, are taking place on Mars, but in a less modified status.

Science News Letter, November 5, 1949

ASTRONOMY

Comet Dust Sifts to Earth

These fragments promise to yield valuable data on matter from outer space. A world-wide search for them was suggested.

► **SIFTING** into the earth's atmosphere at about 850 miles per hour or less are little fragments of comets that promise to give astronomers valuable samples of matter from outside the earth.

Dr Fred L. Whipple of Harvard College Observatory, Cambridge, Mass., told the National Academy of Sciences meeting in Rochester, N Y., about these "micro-meteorites" which are so small that they can smash into our air without being burned to nothing.

A world-wide search for this meteoric dust was suggested. It could be captured in the upper air through airplane flights, recovered from melted snow of remote polar regions or discovered in the depths of the ocean or layers of the earth formed in past geologic ages.

These particles are very small, the largest being about a ten-thousandth of an inch. Because they are so tiny their large surface compared with their weight allows them to get rid of the heat that is caused by hitting the air molecules. Thus they do not burn in a flash of light like the larger meteorites seen in the night sky. They fall to earth as fine dust.

The comet dust can be identified because it is sharp edged instead of being rounded like volcanic material, wind blown particles

or fine material from power plants and other earthly fire. Even the small fragments of the larger meteorites or fireballs should be fused and smooth.

Investigations have been made so far on micro-meteorites by Drs D. K. Norris and Frank Hogg of Toronto and Dr H. E. Landsberg of the U. S. Weather Bureau.

There is hope, Dr Whipple said, that micro-meteorites found in the geological layers can tell us about the history of the solar system. He suggests that deposits of the Cretaceous era should be searched for evidence as to whether the solar system was filled then with more fragments of planets and other cosmic material, as some astronomers have theorized.

For his researches on meteorites, Dr Whipple was presented with the J. Lawrence Smith medal of the National Academy of Sciences, one of the highest awards of American science.

Science News Letter, November 5, 1949

In the 20-year period from 1926 to 1946, some 6,500,000 acres of America were planted in *forest trees* by public and private agencies and individuals, about two-thirds of these planted acres are classed as successful.

MEDICINE

Honor for Brain Findings

Nobel Prize in medicine honors scientist who discovered the sanity-restoring brain operation, and researcher who discovered brain stem role in sleep.

➤ BETWEEN 7,000 and 8,000 mental patients in the United States have had the sanity-restoring brain operation "first conceived and executed" by Dr. Egas Moniz, Portuguese medical scientist who shares this year's Nobel Prize in physiology and medicine with the Swiss brain researcher, Dr. Rudolph Walter Hess.

Dr. Hess is known for his discovery that sleep can be induced by electrical stimulation of part of the brain stem known medically as the hypothalamus and sometimes popularly called the seat of the soul. His studies showed that this particular region of the brain has an active role in bringing on sleep and also in promoting the unconscious activities relating to growth and body nourishment which go on during sleep. Dr. Hess is director of the physiological institute of the University of Zurich.

The operation Dr. Moniz devised is known as prefrontal lobotomy. It consists in cutting connections between certain cells in the front part of the brain. The idea of destroying something in the brain to help a patient with a disordered mind came to Dr. Moniz while attending a conference in

London on defects that resulted from injuries of various kinds to the brain.

The number of cells in the brain is fixed and they show no change in mental disorder. The connections between the cells, however, are changeable and are extremely variable in the normal person. In mentally sick persons, Dr. Moniz reasoned, these connections are stabilized in an abnormal way. Ideas of persecution, delusions, anxieties develop and persist. Disturbing the brain connections, he thought, would free the patient from his morbid mental activity.

Before developing his brain operation, Dr. Moniz had developed a safe way of making the brain's arteries visible in X-ray pictures.

During and after the first World War, Dr. Moniz turned from medical research to serve as his country's foreign minister. His scientific work was interrupted again in 1939 when a homicidal maniac pumped six bullets into him.

His brain operation was first introduced into this country by Drs. Walter Freeman and James W. Watts of George Washington University, Washington, D. C.

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DR. EGAS MONIZ

developed by the Zator Company in Boston should be used. Called "Zatocoding", the method is already in use in punched card information systems. With this system, he said, it is essential that a truly random code be assigned to each recorded idea, and then these codes be used for selection. This method, in its use of statistical principles of random codes to guarantee the desired results, has its analogue in certain of the most advanced radio communication systems which also use a statistical principle to get the message through with the utmost reliability and economy of equipment.

Used in the UNIVAC, the Zatocoding method would give a fail-safe system for information finding with all the wanted information coming out. If there is a statistically-possible wrong selection, then this "failure" would result in extra information, rather than missed information.

As an electronic librarian, a UNIVAC machine could easily supervise a collection of 10,000,000 books, about the number listed in the Library of Congress. You would specify what you wanted with any combination of up to 20 cross-reference ideas. Put into the UNIVAC, Dr. Mauchly said, these ideas would then direct the search at a rate of 150 items per second, and the whole collection would be scanned completely for you in 20 hours. Since the UNIVAC as now designed has a mathematical brain, instead of a specialized "library" brain, he said this performance could be speeded up by at least 10 times with slight changes in equipment.

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Oysters contribute nutritive value to the diet as well as being flavorful, they are an excellent source of proteins, minerals and vitamins.

MATHEMATICS-ENGINEERING

No-Slip Library Machine

Mechanical librarians must be "fail-safe" to prevent information being missed. Need a device to insure more information rather than less in event of failure.

➤ ELECTRONIC mechanical librarians of the future must be "fail-safe" if scientific progress is not to be bottle-necked by lost and misplaced information. When the scientist of tomorrow in his laboratory needs information from the record, a machine librarian must be able to find everything relevant. It must be "fail-safe" and not miss information, Dr. John W. Mauchly, the co-inventor of the ENIAC and other electronic computing machines, told a recent meeting of the Chemical Literature Division of the American Chemical Society.

Railroad lights which turn a safe red when something fails in the system, or electronic computing machines which quickly stop before making mistakes if a tube burns out, are both designed to be fail-safe. The same principle applied to a library machine-searching system will insure, in spite of minor failures due to

quicks of languages or of the classification system of the machine, that the essential information stored in the system will come out safely and will not be lost or passed over. Any slips or failures of man or machine must then cause more information rather than less to come from the searching system.

How to do this with the versatile UNIVAC electronic computing machines, six of which are now under construction by the Eckert-Mauchly Computer Corporation in Philadelphia for government and private users, was explained by Dr. Mauchly. In the first place, the UNIVAC is fail-safe against tube and electrical type of failures by its circuit design.

To make the UNIVAC fail-safe in the searching for recorded thoughts or ideas, Dr. Mauchly pointed out that the superimposed random or "probability coding"

MEDICINE

**Cancer Fight Helped
By Mirror Microscope**

➤ **CANCER** fighting is now being done with mirrors, lenses, and invisible ultra-violet and infra-red light rays. They are being used, in special microscopes, for seeing more of what goes on inside the cancer cell, what special chemicals it needs for its diet, and what chemical changes in normal cells may be linked to the start of cancer.

A new microscope lens for this kind of cancer fighting, developed by David S. Grey of the Polaroid Corporation, was demonstrated at the meeting of the American Cancer Society in New York. Development of lens was sponsored by the Office of Naval Research. It is being manufactured by Bausch and Lomb Optical Company and is already in use at two research centers.

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CHEMISTRY

**Wartime-Like Aerosol Bomb
Has Many Peacetime Uses**

➤ **THE** aerosol bomb, which acquired fame during the war because of its effectiveness in killing insect pests, in a modified form is now serving the civilian population in applications ranging from paint sprayers to fire extinguishers, and even for dispersing whipped-cream to tasty foods.

The civilian bomb is a low-pressure type. The wartime insecticidal bomb was a high-pressure affair, and costly because strong containers were needed. Low-pressure containers are cheap enough to discard after use. They work on the same principle, however, being compressed-gas containers. Aerosol is a scientific term for a suspension of fine particles in the air.

Reports on aerosol research, and a list of trade-literature on low-pressure aerosols, designated as D1 and D2 respectively, are now available from the U. S. Department of Commerce, Office of Technical Services. Requests for them should include the "D" designation. A bibliography of published references on aerosols may be obtained from the Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture. As insecticides, aerosols have practically revolutionized such fields as green house culture, it is pointed out.

Science News Letter, November 5, 1949

GENERAL SCIENCE

**"Dimpled" Golf Balls
Give Longer Drives**

➤ **DIMPLES** in your golf balls give you a longer drive and better control over where the ball will go. Golfers may have claimed this for a long time, but now the scientists have proved it is so.

Spinning golf balls dropped through a wind stream were studied by John M. Davies at the B. F. Goodrich Company wind tunnel in Akron, Ohio. Driving tests by a machine that hit the ball with a mallet-type club were also made, giving results which were consistent with the wind tunnel tests.

Smooth, mesh, standard dimple and biamble (protruding dimple) balls were tested by dropping them through a wind stream where the air had a speed of 105 feet per second. Height of the fall was varied from a little over one-half foot to somewhat under one and one-half feet.

Values of the drag and lift which determine the path of the ball, were obtained by spinning the balls first in one direction then in the other. These showed the effects of dimple and mesh markings to be very similar.

Club speed and face angle of the mallet-type club were varied for the different types of balls. For the dimple balls, the distance the ball covered and the flight path varied with the club face angle as might be expected. With the smooth balls, however, neither the distance nor the flight path of the ball changed much with the mallet variations.

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GEOLOGY

**Coal Reveals Plant Cells
In New Microscope Method**

➤ **A NEW** method of preparing specimens for the electron microscope reveals the cell structure of the ancient plants that went into the formation of coal.

The new technique consists in taking a plastic impression of the surface of a polished cube of coal, and then photographing the impression through an electron microscope. The older technique of peeling or slicing thin sections of coal gives specimens which are too thick for profitable study. The plastic replicas are about one-tenth of a micron, the desirable thickness.

Outlining the method in *ECONOMIC GEOLOGY* (Nov.), J. T. McCartney of the Pittsburgh station of the U. S. Bureau of Mines says that the coal cubes, about the size of large dice, are polished and then placed briefly in an etching bath of chromic acid-sulfuric acid. After washing and drying in filtered air, they are dipped in a solution of polyvinyl formal. Over this a second layer of film, nitrocellulose, is applied. When dry, the double film of polyvinyl formal and nitrocellulose is stripped off. This film, bearing an impression of the coal's surface structure, is photographed through the electron microscope.

Dr. McCartney believes that these studies will reveal more clearly some of the finer details of coal structure that are not yet fully understood.

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PHYSICS

**Reveal Plastic Film that
"Combs Out" Heat Waves**

➤ **INVENTION** of a plastic film that "combs out" heat waves and allows their use in secret signalling and enemy detection was revealed to the Optical Society of America meeting in Buffalo, N. Y., after six years on the military secret list.

A research team from Polaroid Corporation, consisting of R. P. Blake, A. S. Makas and C. D. West, told how they developed during the war this first polarizer for infrared rays in convenient sheet form. Applications in scientific research and industry are expected for this simple polarizing device for the long invisible heat waves. Cumbersome reflecting plates were used previously.

Film polarizing visible light is made in large quantity and has many applications, including sunglasses that screen out scattered light causing glare. The heat-rays orienting film is made by combining two treatments used in making two types of polarizing film for visible light. A polyvinyl alcohol plastic stretched to align its molecules is first treated with iodine and then dehydrated.

The film makes "optical slots" that let the rays pass in one position and shut them off when turned at right angles.

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ENGINEERING

**Quarry Rock-Blasting
Better with Timed Delays**

➤ **ROCK** blasting in quarries is found to give improved breakage, less vibration and to decrease claims for damages when the explosions follow one another in a tiny fraction of a second rather than occurring at the same instant.

This new system of blasting was explained to the National Safety Congress in Chicago, by D. M. McFarland, Atlas Powder Company, Wilmington, Del. The split-second delay blasting, he said, is meeting ever-widening acceptance in the industry because of the improved results it offers.

The introduction of millisecond delays, he said, in addition to improving breakage and backbreak in multiple row quarry blasts has also produced a noticeable decrease in the noise from such blasts and vibration effects were diminished. The system is suitable for use in mining, in his opinion, but miners will have to be taught its advantages and how to use it before it can come into general use.

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E FIELDS

MEDICINE

Housing in Oak Ridge Greater Threat than Bomb

➤ THE health of workers at Oak Ridge, Tenn., was more endangered by poor housing conditions than by the atom bomb.

A study which revealed a five times greater rate of meningitis, serious brain and spinal cord disease, among people living in the hurriedly constructed homes on the project, was reported in New York. It was conducted by Dr. Bernard M. Blum, director, the Fife-Hamill Memorial Health Center, Philadelphia, and William F. Elkin, statistician, health physics division, Oak Ridge National Laboratory.

Meningococcal disease was 14 per 100,000 population among persons living in standard housing but increased to 79 per 100,000 among people in sub-standard housing or slums, Dr. Blum told the American Public Health Association.

Negroes were stricken more often than white people, 174 per 100,000 as against 64 per 100,000. This confirms the findings of other studies showing their greater susceptibility.

Men were found almost three times more liable to be attacked by the disease than women, although the difference in rate was smaller between boys and girls.

Dr. Blum attributes the greater exposure to chilling and fatigue among the adult men workers for this difference.

The study was made to find the effect of the slum areas on the rate of meningitis. Oak Ridge was especially suited for the study because inhabitants of the slum areas were often people of professional standing and not necessarily in the low income bracket. This revealed that their health was dependent on their environment rather than on their economy.

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AERONAUTICS

Pre-Heat System in Plane Engine Beats Arctic Cold

➤ FAR-BELOW-zero weather failed to prevent easy engine starting on an Air Force Boeing B-59 Superfortress with a special self-contained engine pre-heat system in recent cold weather tests in the Arctic region, it was revealed by the Boeing Airplane Company, Seattle, Wash.

To adapt the giant plane for operation in extreme low temperature, several modifications were made. In addition to the engine pre-heat system, cold-starting accessories, a new oil dilution system and many other refinements were made. Included in

the installation were 640 separate thermocouples, electrical thermometers, to record temperatures in all parts of the plane.

Principal modification was the use of the plane's standard combustion-heater wing anti-icing system to pre-heat all four engines prior to flight. This was accomplished by covering the propeller hubs and cowling entry ducts and diverting the hot anti-icing air into the engine compartments. When the engines reached a temperature for normal starting the covers were removed by ground crews.

The new oil dilution system employed was designed to prevent pump failures during the cold starts. Gasoline used to dilute the oil at low temperatures evaporates and is filter-removed from the system within ten minutes of engine starting. The thermocouples used kept an accurate record of temperatures at such locations as oil and hydraulic tanks, wing, body and engine nacelles. They also recorded temperatures in crew-carrying compartments.

Science News Letter, November 5, 1949

MATHEMATICS-ENGINEERING

Zero Location Important In Electronic Problems

➤ WHETHER or not your telephone connection snicks like a wild banshee, or a radio gun-pointer goes completely off its rocker and shoots friends instead of enemies, all depends upon the location of "zeros."

A new book to help engineers and scientists to cope with the crucial problems of "stability" of electrical, electronic, and mechanical devices has just been brought out by Prof. Morris Maiden of the University of Wisconsin in Milwaukee, and published by the American Mathematical Society, New York (\$5.00). Since Prof. Maiden's book stresses the location of the zeros, it has the title *THE GEOMETRY OF THE ZEROS OF A POLYNOMIAL IN A COMPLEX VARIABLE*.

What matters is the location of these zeros, the "roots" of the polynomial equation that describes the device in question. For instance, in a telephone system, if the zeros are all to the left of the central axis when plotted out in the complex plane, then the telephone amplifiers will amplify the voices instead of going into an uncontrolled howling.

The book is expected to be important to engineers and applied mathematicians who have to work with all sorts of control mechanisms and "feed-back" circuits. For them and for the general mathematical reader, it will collect results in this important field—which is 115 years old, and still rapidly developing—into one convenient book. By getting the important results all in one place, the book is expected to help avoid future duplication of old work, a serious problem in science, and to facilitate further progress in this field.

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MEDICINE

Vitamin E May Stop Blindness in Early Babies

➤ VITAMIN E is showing promise of checking a disease causing blindness in premature infants, Dr. William Councilman Owens and Ella Uhler Owens, of Johns Hopkins University Medical School, Baltimore, Md., told the American Public Health Association in New York.

The blinding disease is retrolental fibroplasia and is similar to congenital cataract but differs from it in that there are blood vessels in the membrane film located behind the crystalline lens of the eyes.

Drs. Owens found that the disease strikes about 15% of infants weighing three pounds or less. Earliest signs of the disease appear when the babies are about four weeks old and the disease process is usually complete by the time they are four months old.

Although the cause of the disease is still unknown, Drs. Owens believe it may be tied up with metabolism. They reason that when the first signs of the disease appear it is at a time when the infant, due to physiological immaturity, may be unable to meet the body's nutritional requirements from the diet he gets.

Premature babies are usually given vitamins A, D, and K to supplement their dietary needs. Drs. Owens have added vitamin E to their diets, beginning the first week after birth with very encouraging results. However, they caution, there is no successful treatment once the disease has taken hold.

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VETERINARY MEDICINE

No Record of Russian "First" on Cattle Vaccine

➤ SCIENTISTS in Washington have searched the literature in vain looking for the name of the Russian who Moscow claims produced the first foot-and-mouth disease vaccine.

Modern vaccine, like that being used in the current campaign against the disease in Mexico, is based on work done by Sven Schmidt of Denmark and Otto Waldmann of Germany in 1937 and 1938. Experts on the cattle disease failed to find any reference to an earlier Russian discovery in the U. S. Department of Agriculture library.

The only clue to the basis for the Russian claim is the fact that the Isle of Rheims off the German Baltic coast where Waldmann pursued his researches is now part of the Russian-occupied zone. One scientist suggested the possibility that Russia is exercising "retroactive dominion" over the scientific work done on the German island. Waldmann himself is now living in Argentina.

Science News Letter, November 5, 1949

POPULATION

1950 Is Census Year

Next April is set for the taking of the regular 10-year count of the population. Latin American representatives are being sent here for training.

By MARJORIE VAN DE WATER

► YOUR Uncle Sam is now completing plans for making his regular decennial count of all his many nephews and nieces.

Some time next April the census taker will knock on your door and will ask you a series of questions. You and your husband or wife (if you have one) will be counted and so will all the children down to the youngest infant in arms.

Better ask him to come in and sit down when he arrives at your house, because he will come armed with lots of large sheets of paper in a portfolio. And it is pretty hard to stand on a porch or in a field in the wind and fill out all the places on those big forms. They can and will do it, but it is much nicer for the census taker if he can spread things out on your dining table or living-room sofa.

The papers are much more formidable than are the questions themselves. You will probably be surprised at how quickly he gets his information and the interview is over. The average is about 15 minutes to take down all the information about your name, age, sex, race, whether you are married, single, widowed, divorced or separated, place of birth and whether you are working or unemployed.

Districts Assigned

Uncle Sam is sending an army of these census takers into the field. Each is assigned a certain district and is supplied with a map showing the boundaries of his assignment. He has instructions to count every man, woman, and child within those limits. The size of the district is arranged so that he can make his complete count and be done in about two weeks. Experience has shown that he will be able to count about 1000 persons in that time. Since the total population is estimated to be about 150,000,000, between 140,000 and 150,000 enumerators will be required for the job.

You, enumerator, will have been specially trained for his work before he calls on you. If you live in a city, he has gone to school for one day, and then has gone out for a day of practice in census taking. And then, having faced a sample of the problems he will encounter, he goes back for another day of training. The enumerator who will work in the country will have a second day of counting, followed by a third day of training. That is because his work is complicated with the agricultural census

that is being taken at the same time as the population census.

In addition to the information that is gathered for every man, woman and child in the nation, additional questions will be put to a sample of the population. This sampling is done in a different way from that used by the election pollsters, and a way that is believed by Census officials to be more accurate.

Election polling is done by the quota system, which works like this. The interviewer is instructed to start from a certain corner and talk to people until he has interviewed a certain number having the required age, sex, and other important characteristics. Unconsciously, he may pick a biased group because of the fact that certain people are not at home, or at work, at the time the interviews are conducted or because the interviewer selects people he thinks he would like to talk to and so gets a group somewhat like himself in social or economic class.

The Census instructs the enumerators to ask questions about housing, for example,

in every fifth house or of every fifth person seen, covering his entire district in this way. If he is asking in every fifth house and they are not at home, he goes back until he finds someone. Thus, it is believed a fair cross-section of the nation is reached.

If you are that "fifth" person, you will be asked where you lived a year ago, the country of birth of your parents, what language, other than English, was spoken in your home when you were a child, and, if you were born outside the United States, about your citizenship.

Housing Questions

Housing questions to be asked of every fifth occupied house include the following. Do you have electric lighting? Do you have a radio? What kind of refrigerator do you have—electric, gas, or ice box? What kind of stove? What fuel do you use for cooking? For heating?

When the census taker has completed his task, then the real work begins in Washington. The information must all be translated into a code and cards must be punched with holes corresponding to the coded information, a card for each person. At the peak of production more than 1,000,000 cards will be punched and verified each day.



YOU'LL BE COUNTED NEXT APRIL—Information about your name, age, sex, race, whether you are married, single, widowed, divorced or separated, are among some of the things you will have to answer when the census taker comes your way.



SORTING INFORMATION—*Facts obtained from you will be punched according to a code onto a card, which will be run through machines like this to sort them.*

At one time it was hoped that a "document sensing machine" could be used to punch the cards automatically. Under this plan the census enumerators would make use of a special metal pencil to fill out the questionnaires. These metallic marks would later be "sensed" by the machine which would punch the cards to correspond.

Flaw in Trial Censuses

First flaw was detected in trial censuses. The special pencils turned out to be a nuisance. In the first place, the ink leaked on the enumerator's shirt pockets and got on the dresses of the ladies interviewed. But more important, when the enumerator had asked his questions and was all ready to take down the answers, the pencil would go on strike and refuse to write. But that was not all. To go through the machine properly, the questionnaires must all line up perfectly, and paper of the size used in the questionnaires shrinks and stretches with changes of weather in Washington so that it cannot be kept perfectly aligned.

Thus, the main reliance will still be on the army of key punch operators to make the cards that will go through the tabulators.

The cards are sorted and resorted and totals are made for each age, sex, race and other item of information collected. The information is then printed in big tables, ready to go to the printer. All this work is done automatically by machine.

Principal new thing about the 1950 census will be a change in the definition of rural and urban population. In 1940 persons were listed as city dwellers only if

they lived in places of 2500 inhabitants or more that were regularly incorporated. But around each of our large cities there is a suburban fringe that is not within the city limits. Those living in this suburban fringe were listed in the 1940 census as non-farm rural population. In 1950, boundaries will be established for the suburban fringe around the cities of 50,000 or more inhabitants and all the people living in this area will be classified as urban population. In addition, those towns of 2500 population or more, but which, for one reason or another, have never been incorporated will be counted in with the incorporated cities as urban population.

Definition of "Family"

The definition of a "family" will also be slightly different for the 1950 census. In 1950, all the related persons living in the same home will be considered as a single family, even though there may be more than one married couple living together in the household.

Some of the information that is to be obtained from only a sample 3 1/3 per cent of the population is that pertaining to length of marriage and fertility. The selected married persons will be asked if they have been married more than once and how many years they have been married. Women will be asked the total number of children they have ever borne.

To the Census, all people who have children are married. There is no tabulation of unmarried people with children.

In 1950, for the first time, Uncle Sam will have the company of all his Latin American neighbors in making the census. Agreement has been reached on what information to record for each person and how to tabulate it, so that for the first time, comparable figures will be available for all the Americas. Argentina is the only country not making a census in 1950, and that is because she just made one in 1947 and is still busy with the tabulation work.

Latin American countries are sending their statistical experts to this country for training in our National Office of Vital Statistics, Bureau of Agricultural Economics and Bureau of Labor Statistics, all bureaus concerned with the census. In addition all these trainees will receive a four-month course of training in the Census Bureau. By next Jan. 1, 200 persons will have received this training. In addition, consultants are going from the United States to visit Latin American countries and advise them. For some of our neighbors, the 1950 census will be their first experience with an enumeration of their population.

In counting the indigenous people living in the almost inaccessible regions of the Amazon valley in Brazil or the unexplored wilds of the Paraguayan chaco, the census taker will face unparalleled difficulties.

In many parts, there are no towns, no

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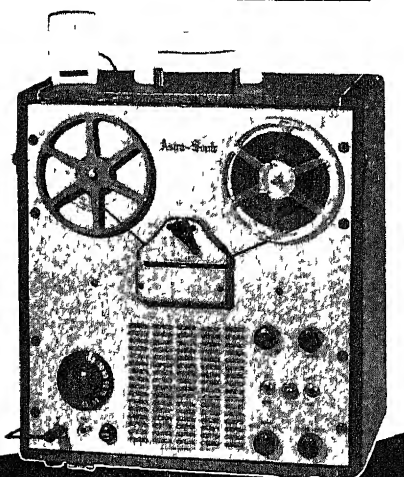
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roads, no houses. He must find the people, one by one, traveling afoot, on horseback or in canoe. He must carry his questionnaires in one hand and defend himself against wild animals, snakes or unfriendly humans with the other.

Cooperation of the people must be won

PUBLIC HEALTH

Reduce TB Germs in Air

➤ DANGER of getting tuberculosis by breathing the air-borne germs can now be greatly reduced with ultra-violet germicidal lamps, H. M. Vandiviere, director of bacteriology and parasitology research, State Department of Public Health, Atlanta, Ga., and his co-workers discovered.

The air was tested by a device called an impinger concentrator which breathes in one cubic foot of air per minute. The TB germs collected were exposed to direct irradiation under ultraviolet lights. It was found that the droplets ejected into the air by an infected person could be killed after 22 hours' exposure at a distance of six and eight feet, he told the American Public Health Association in New York.

These germicidal lamps also kill about 70% of all other air-borne bacteria usually found in a room, Mr. Vandiviere pointed out.

This is a promising way of protecting workers exposed to TB, he said.

The experiments were made at the Battey State Tuberculosis Hospital with the cooperation of C. Edwin Smith, director, Battey State Hospital Laboratory, Rome, Ga., and Earl J. Sunkes, director of Laboratories, State Department of Public Health, Atlanta, Ga.

Food spoilage by molds, which cause destruction running into millions of dollars every year, can also be reduced with the use of ultraviolet lamps. Spores of various molds are destroyed or made inactive in the air with ultraviolet, experiments conducted at Lighting Research Laboratory of the General Electric Company in Cleveland, showed. The work was reported to

so that they will be willing to disclose information to the census taker. This is a problem in the United States, it will be even greater in those countries unfamiliar with censuses and where the people look with suspicion on anyone coming around asking questions.

Science News Letter, November 5, 1949

the meeting by Matthew Luckiesh, A. H. Taylor, Thomas Knowles, and E. T. Lempelmeier of GE.

Aerial disinfection with the chemical, triethylene glycol vapor, is another effective method of ridding the air of both bacteria and viruses. But it requires that the relative humidity be within a range of 20% to 50%, otherwise the killing action of the chemical is reduced. This was pointed out by Dr. William J. Lester, Dr. O. H. Robertson, Saul Kaye and Edward W. Dunklin, all of the University of Chicago.

Science News Letter, November 5, 1949

Three "church boats," which were put into service after the war as a temporary measure for the benefit of northern Norway villages, whose churches were burned by Nazi invaders, will probably be retained indefinitely.

Words in Science—

TRANSPARENT-TRANSLUCENT

➤ TRANSPARENT is from two Latin words, *trans* which means "through" and *pareo* which means "appears." This word is applied to materials through which you can see objects clearly.

Translucent, from the same word *trans* and another Latin word *luceo*, "shine," describes material which lets light through but is not transparent.

If a substance is neither translucent nor transparent, it is said to be opaque.

Science News Letter, November 5, 1949

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Specifically, the equipment consists of **MAGNETISM**—Horseshoe-type Magnet, Package of Iron Filings, Compass Card, Lodestone **STATIC ELECTRICITY**—Sealing Wax, Metal Foil, Pyrex Test Tube, Fur, Cornstalk, Gold Leaf, Metal Disk and Sheet of Acetate Film for Electrophorus **CURRENT ELECTRICITY**—Zinc Strip, Coil of Insulated Copper Wire, Carbon Rod, Sal Ammoniac **ONE PARTS BOX CONTAINING**—a compass bearing, steel needles, steel pins for compass, gummed strips, soft iron nail, cork disks, ball bearings, straw, ball and pin for electroscope

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26 experiments on fluorescence, phosphorescence, and glowing paints are suggested in the instructions for this kit, along with how to use fluorescent material in crime detection and how to get stroboscopic effects.

Specifically, the equipment consists of **SIX MINERAL SPECIMENS**—Wernerite, Semiopal, Autunite, Green Fluorite, Willemite, Brown Fluorite

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A fluorescent golf tee, a brush, a star map, a stroboscope, a picture (for coloring) One 110 Volt Argon Lamp—Rich in ultra-violet

Kit No. 3

FUNdamentals of Science **SOILLESS GARDENING**

This kit has the instructions and the equipment for a soilless garden in the house or in an apartment without regard to weather How to plant seeds, how to water and feed them, how to transplant, about water culture, sand culture, soilless gardening on gravel or cinders, about deficiency symptoms, about seedless fruit hormone, and how to produce seedless tomatoes, and how Hormodin is used—all this knowledge is in the Soilless Gardening Kit

There are suggested experiments with sprouting seeds, and how to speed germination, on the importance of chemicals and how plant roots produce acid, about phototropism and geotropism, how to grow carrots upside down, how to perform tricks with plants (changing the length of day) and what total darkness does to plants, what light versus gravity does, colored light, and the use of colored tents

Specifically the equipment consists of One dozen green **POTS** (that you can assemble), **COLORED CELLOPHANE** sheets to be used in light and growth experiments, **CHEMICALS** your plants will need—potassium acid phosphate, magnesium sulfate, calcium nitrate, ferrous sulfate, Seven kinds of **SEEDS**—Russian sunflower, Earliana tomato, Globe radish, Dwarf nasturtium, Okra, Soya bean, Ornamental gourds, Box of **VERMICULITE**, Plant Breeding Material—**HORMODIN**, **SEEDLESS FRUIT HORMONE**.

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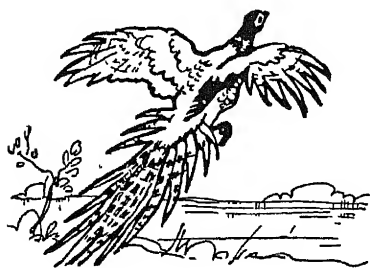
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Pheasants

► THE pheasant belongs to a group of birds that is sometimes referred to as the true game birds. It bears a rather close cousinship to partridge, grouse and turkey, which all fall in this same category.

It is generally believed that the American bird is an introduction, not a native. Two kinds were introduced, the Chinese pheasant and the English ring-necked pheasant, so the lineage of today's ring-necked pheasant is undoubtedly mixed. The earliest known successful introduction of pheasant into the eastern United States was in 1887, probably as a replacement for ruffed grouse and bobwhite. These native sporting birds suffered serious diminishment in many places as a result of cultivation of their native habitat and over-shooting.

The pheasants that have succeeded in becoming established thrive better in open country than the ruffed grouse, although the latter is better adapted to the climate,

especially in the northern states.

The long graceful tail, which in the male achieves a special glory, seriously hampers the pheasant in winter. When combined with its usual habit of roosting and feeding on the ground, the tail has been known to cause the bird's death. Digging its tail along the ground after a wet snowstorm as it searches for food, the pheasant picks up snow which with a sudden drop in temperature frequently turns to ice. In the mid-west particularly, where wet snows turning into sleet are common, pheasants have been seen digging heavy balls of ice that have formed on their tails. Sometimes this mass becomes frozen to the ground and the helpless bird is trapped.

Many an unwary hunter or walker in the woods has been half scared to death by the sudden explosion skywards of a

disturbed female pheasant. This marvelous stratagem is designed for the altruistic purpose of distracting attention while her young scurry to safety. This trick is employed not only when man comes too close for comfort, but whenever any of the pheasant's natural enemies approach the covert. Not only man, but cats, rats, weasels, great horned owls and other predators, are successfully outmaneuvered by this diversionary tactic.

The male does not waste his splendid talent in monogamy. He struts and crows over a haem of hens who are his by right of battle. But if he revels in the privileges which go with his gorgeous attire, he also recognizes his responsibility. Whenever he discovers a supply of food, he gallantly summons the females to join him.

Science News Letter, November 5, 1949

Books of the Week

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ACETYLENE AND CARBON MONOXIDE CHEMISTRY—John W. Copenhaver and Maurice H. Bigelow—*Reinhold*, 357 p., illus., \$10.00. A critical treatment of the chemistry of acetylene under pressure.

THE AMERICAS: The Search for Hemisphere Security—Laurence Duggan—*Holt*, 242 p., \$3.00. The well-known former Department of State official had nearly finished this account of inter-American relations preceding the Bogota Conference when the work was interrupted by his untimely death. Minor touches to complete it were added by his wife, Helen Duggan, and by two friends, Marshall J. Wolfe and Herschel Brickell.

ANTARCTIC CONQUEST: The Story of the Ronne Expedition 1946-1948—Finn Ronne—*Pittman*, 299 p., \$5.00. The adventure story of an expedition that explored for the first time 250,000 square miles at the end of the world and made aerial photographs of 450,000 square miles, bringing back a wealth of scientific data.

BITUMINOUS COAL ANNUAL 1949: Facts and Figures—*Bituminous Coal Institute*, 192 p., illus., paper, 75 cents. A handbook of information and statistics on an important industry.

BOBWITES ON THE RISE—Verne E. Davison—*Scribner's*, 150 p., illus., \$3.75. A practical book on how to preserve the bobwhites which are at present dying out.

THE BUSINESS HELPER: For the Modern Man Operating a Small Business—Leslie C. Rucker—*Rider*, 133 p., \$2.00. A practical guide to help answer everyday questions that arise to give the little businessman headaches.

CATALOGUE OF BIRDS OF THE AMERICAS AND THE ADJACENT ISLANDS IN FIELD MUSEUM OF NATURAL HISTORY—Charles E. Hellmayr and Boardman Conover—*Field Museum of Natural History*, 358 p., paper, \$4.00. Part I, Number 4 of the Museum's Zoological Series, thus completes the Catalogue of Birds. The senior author completed the manuscript before his death, but it has been amended by

the junior author who brought the bibliography up to date.

THE ELEMENTS OF GENETICS—C. D. Darlington and K. Mathai—*Macmillan*, 446 p., illus., \$3.75. A concise textbook with a valuable glossary.

FIRST AID TEXTBOOK FOR JUNIORS—American Red Cross—*Blakiston*, 132 p., illus., \$1.00. A textbook for teaching first aid in schools and other organizations. A handy book to have in the house to consult "until the doctor comes."

GENETICS OF THE FOWL—J. B. Hutt—*McGraw-Hill*, 590 p., illus., \$6.50. With emphasis on chickens, this work summarizes and surveys the scattered and voluminous literature on heredity and variation in the domestic fowl.

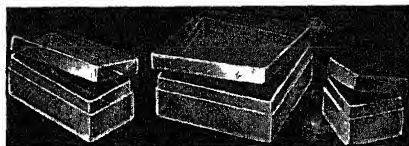
GEOLOGICAL RESOURCES OF THE TRINITY RIVER TRIBUTARY AREA IN OKLAHOMA AND TEXAS—A. E. Weissenborn and H. B. Stenzel, Eds.—*University of Texas*, 252 p., illus., paper, \$2.50, cloth \$3.75. Report of a cooperative project of the U. S. Geological Survey and the Bureau of Economic Geology of the University of Texas. Important in relation to extensive program of conservation and development planned for this area.

GREEN FIELDS ARE GOLD—*Joint Committee on Grassland Farming*, 4th ed., 43 p., illus., 25 cents. Information in question-and-answer form on how to make money by putting easily eroded land into grasslands.

GUIDED MISSILES—A. R. Weyl—*Temple Press*, 139 p., illus., paper, 7 shillings and 6 pence (\$1.05). A short history of guided missiles up to the present time, and a forecast of the future, including a section on "defence against robot aggressors." Of British origin.

GUIDEPOSTS TO MENTAL HEALTH. 1, Life Begins; 2, School Days; 3, Teen Time; 4, Your Job; 5, Your Marriage; 6, The Middle Years; 7, The Golden Age—*New York State Department of Mental Hygiene*, each 6 p., paper, free on request to publisher, Albany, New York. A series of booklets intended to

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HYGIENE AND PUBLIC HEALTH—Earl B. Eiskine—*Prentice-Hall*, 327 p., illus., \$5.00 A guide to personal and community health for liberal arts, engineering, architecture and commerce college students.

INDIANS OF THE URBAN NORTHWEST—Marian W. Smith, Ed.—Columbia, 370 p., illus., \$6.00 A study of the Coast Salish Indians of the coastal regions of the Northwest from Vancouver to Portland. A vast amount of data for the social scientist, including the personal narrative of a famous shaman.

INTRODUCTION TO SEMI-MICRO QUALITATIVE ANALYSIS—C. H. Solum—*Prentice-Hall*, 196 p., illus., \$2.00 A manual for a one-semester course for students with a background of general chemistry.

LEARNING ELECTRICITY AND ELECTRONICS EXPERIMENTALLY—Leonard R. Crow—*Scientific Book Publishing Co.*, 525 p., illus., \$4.40 Experiments designed to enable the student to learn by doing. Intended to show how the principles covered have a direct bearing on electrical devices in common use.

LIVING CHEMISTRY—Maurice R. Ahrens, Norris F. Bush, and Ray K. Pasley—*Ginn*, 551 p., illus., \$3.60 A high-school text.

PROFILE ART—R. L. McGior—*Philosophical Library*, 131 p., illus., \$7.50 A study of the use and significance of profile and silhouette from the stone age to puppet films. A pictorial history.

THE RACES OF THE AFRICAN WOOD DOWY TUR-TUR ATLAS—A. L. Rind—*Chicago Natural History Museum*, 7 p., paper, ten cents. A survey of the species.

RADIOACTIVE TRACER TECHNIQUES—George K. Schweitzer and Ira B. Whitney—*Van Nostrand*, 241 p., illus., \$3.25 A guide for laboratory work and suggestions for utilizing radioactive tracers.

THE SAGA OF THE WATLOWI—Martin Bovey—*Wildlife Management Institute Publication*, 140 p., illus., \$5.00 An account of what has happened to our ducks and geese since the enterprising pioneers first laid hands on what once was truly a hunter's Paradise. Beautiful illustrations.

SATURATING CORE DEVICES Operating Principles and Applications—Leonard R. Crow—*Scientific Book Publishing Co.*, 373 p., illus., \$4.20 Not intended for engineers to obtain specific design and performance data, but to acquaint the elementary student in electric sciences with phenomena not to be found conveniently elsewhere.

THE SHOULDER ARCHITECTURE OF BEARS AND OTHER CARNIVORES—D. Dwight Davis—*Chicago Natural History Museum*, 20 p., illus., paper, 25 cents. His shoulder structure enables a bear to hoist the maximum possible weight up a vertical tree trunk.

THE STORY OF MAGNESIUM—W. H. Gross—*American Society for Metals*, 258 p., illus., \$2.00 One of a series prepared with the purpose of providing technical information on metals in readable form for the general public.

VISION ITS DEVELOPMENT IN INFANT AND CHILD—Arnold Gesell, Frances L. Ilg, and Glenna Bullis—*Hoeber*, 329 p., illus., \$6.50 Based on a systematic study of vision development from the earliest days of life before birth up to the tenth year after birth. Study of a blind baby is included.

WELD DESIGN—Harry D. Churchill and John B. Austin—*Prentice-Hall*, 216 p., illus., \$6.65 A practical book for engineers telling how to design welded machine bases.

Science News Letter, November 5, 1949

DENTISTRY

Gums As Well As Cavities Need Care for Good Teeth

➤ TO SAVE your teeth you must take care of the gums as well as having the cavities filled, facts presented to the American Public Health Association in New York, by Dr. Samuel Charles Miller, professor,

New York University College of Dentistry, suggest

Gum diseases are responsible for over half of the teeth which are lost, he pointed out. Dentists refer to the condition as periodontal disease and believe that practically all children have it. Moreover, the disease carries into adulthood if not corrected.

A step in prevention is proper diet. This diet must meet more than nutritional needs for it has been found that a diet adequate in this respect still may cause great harm to the teeth and supporting structures because of its effect on these tissues, Dr. Miller stated.

He further outmoded methods in tooth-brushing such as rotary brushing, cross brushing, brushing on arising and before bedtime, saying they were a bad carry-over from the past. Effective brushing of teeth is after each meal, he declared.

Science News Letter, November 5, 1949

THE CHEMICAL ELEMENTS

Compiled by
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Arrangement of atomic weight

Logarithm of valence

Isotopes and color

Crystalline form and density

Specific gravity and boiling points

Melting and boiling points

Specific heat

Heats of vaporization and fusion

Heat conductivity

Electrical resistivity

Coefficient of thermal expansion

Occurrence, preparation and uses

The radioactive elements (4n+2)

The Uranium-Radium Series (4n+3)

The Actinium Series (4n+3)

The Thorium Series (4n)

The Neptunium Series (4n+1)

Synthesis of Transuranium Elements

Map showing production in U.S.A.

Distribution in earth crust, in ocean, in atmosphere, and in human body

The Electrochemical Series

Critical constants for gaseous elements

Alchemical symbols

Index to the elements

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❁ **FROSTING FOR WINDOWS** is a paint that gives the same effect as commercial ground glass, permitting clear light to enter but providing privacy even under extreme illumination. Applied by brush or spray, it dries quickly to furnish a washable finish.

Science News Letter, November 5, 1949

❁ **UPHOLSTERY PROTECTOR**, for automobile doors, is an easily-installed tough, transparent plastic sheet that comes in sets to fit many makes and styles of cars. Attached to each door separately with special tape and clips, it provides a grease- and flame-proof covering.

Science News Letter, November 5, 1949

❁ **SCREW-THREAD MEASURING DEVICE**, inexpensive but accurate, consists of a connected pair of precision-ground triangular steel bars, with points truncated to clear the root of the thread being measured. The bars are placed one on each side of the screw-thread, and a micrometer measurement taken.

Science News Letter, November 5, 1949

❁ **TELEVISION ANTENNA**, a reversible beam type suitable for use in areas lying between stations utilizing the same or adjacent channels, may be instantly re-

versed for reception from either direction without rotation. The "V" attachment, shown in the picture, provide uni-directional reception.

Science News Letter, November 5, 1949

❁ **PLASTIC BATH KIT**, with zipper closure, packs flat, hangs by a loop, and is completely water-proof. Fittings include flexible plastic bottles, soap dish, pockets

for shower cap, wash cloth and razor, and tabs for toothbrush.

Science News Letter, November 5, 1949

❁ **TWO-CYLINDER PUMP**, only two inches long, is a part of a compact electro-hydraulic temperature control system for hand-fired house heating plants. The kit, of which it is a part, includes a tiny motor and a thermostat. The installation, plugged into a basement outlet, automatically adjusts dampers.

Science News Letter, November 5, 1949

❁ **FLXIBLE RUBBER MOLDS** enable a hostess to cast miniature figurines in wax for use on the dining table. By melting old candles, the molds can be filled with melted wax, and the figure formed—colored, if desired, by a thin layer of colored wax applied as a coating.

Science News Letter, November 5, 1949

❁ **TOBACCO COMPOSITION**, recently patented, contains a glycerin-like stable chemical known as alphanemethylglycerine, a pure sample of which will absorb from one-half to two-thirds its volume of water in two or three days in a humid atmosphere. It is claimed to keep the tobacco at a proper moisture content.

Science News Letter, November 5, 1949

Do You Know?

Potash, for fertilizers, is to be obtained from the water of the Dead Sea.

Lice feed on the blood they suck from their victim; this causes the stinging sensation and itchiness that invite scratching.

Iran is almost self-sufficient in its production of most agricultural items needed to feed its people, except sugar and tea.

Although the Canadian aluminum industry is less than 50 years old, and the nation has none of the necessary raw materials to produce this metal, it is now sixth in dollar value on Canada's export list.

The Old World holds both the high and the low outdoor temperature records, the high is one of 136 degrees Fahrenheit recorded in Libya, North Africa, and the low was 90 degrees below zero at Verkhoyansk, Siberia.

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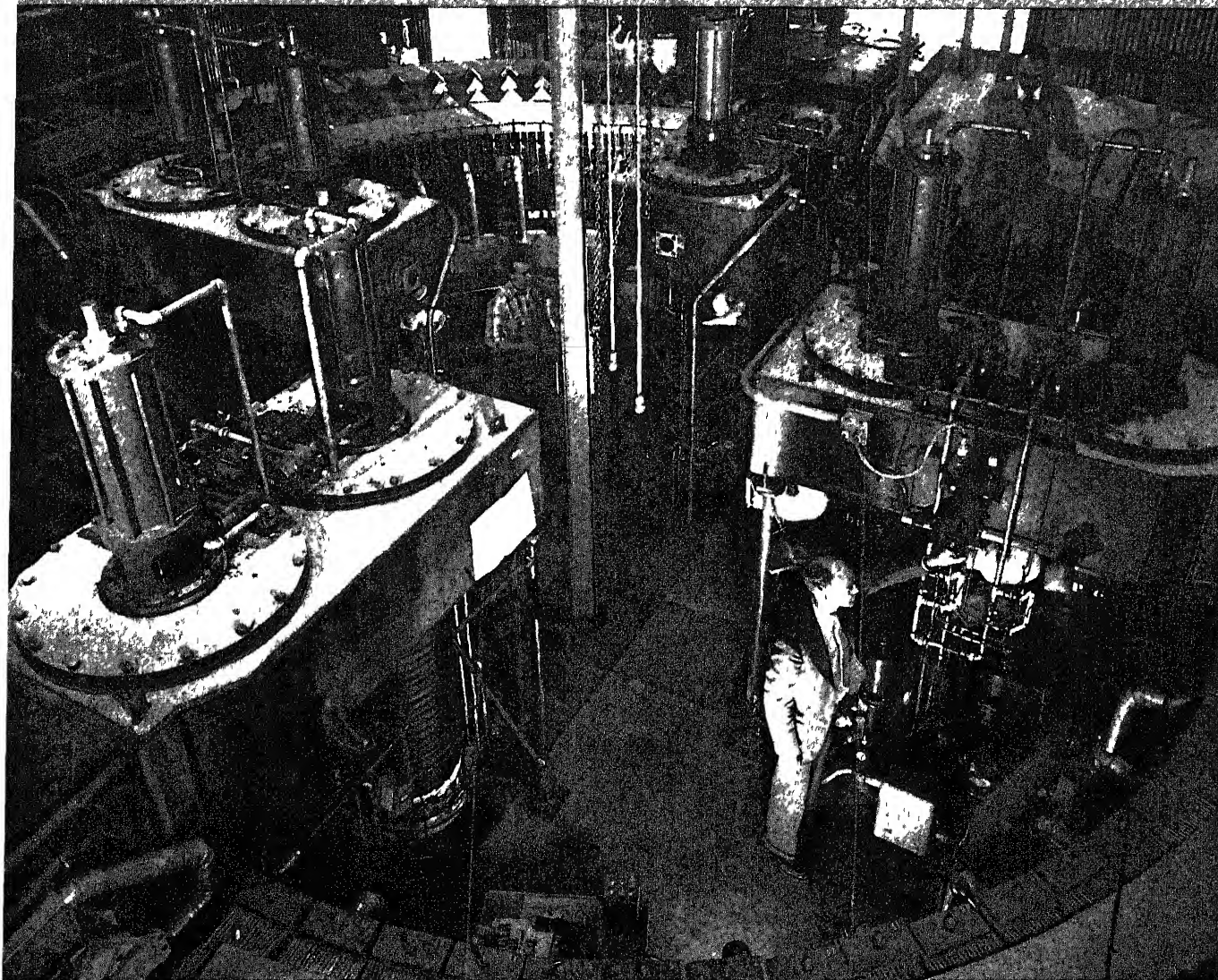
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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



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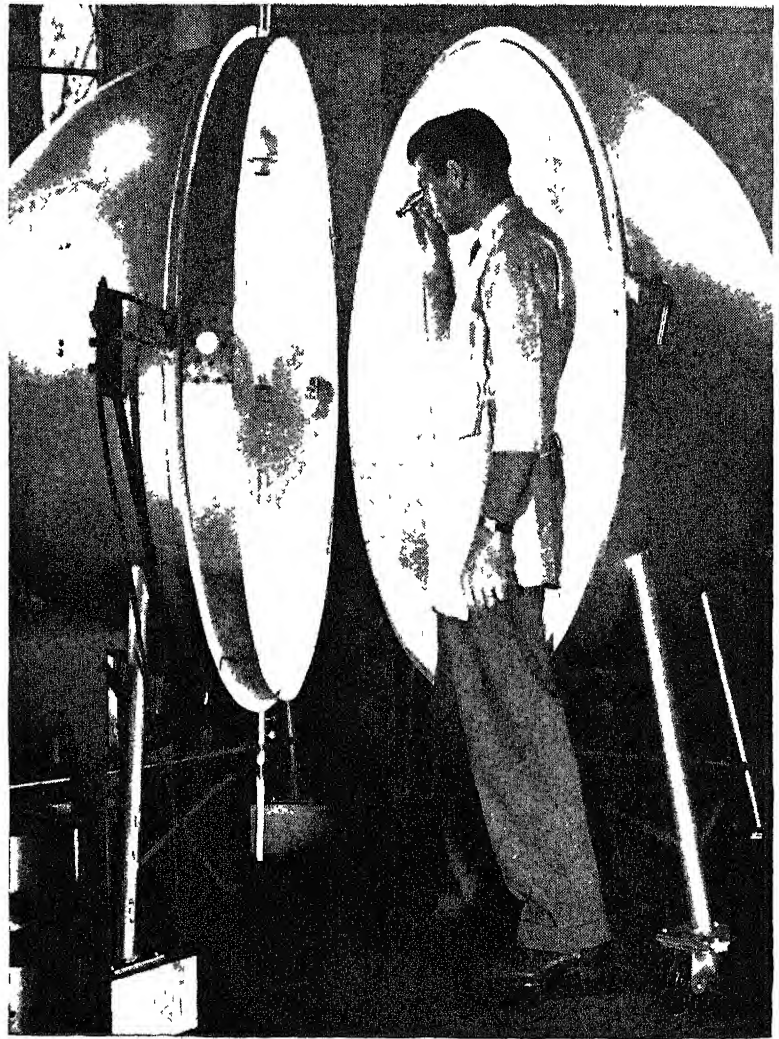
at the Brookhaven National Laboratory, New York. See Page 308

A SCIENCE SERVICE PUBLICATION

10 A YEAR

VOL. 56 NO. 20 PAGES 305-320

What is a **LAMP?**



Way back when, before the days of modern research, the answer to this simple question was easy. Today, the definition grows complex.

A Westinghouse engineer in the lamp research department would visualize the 10,000 types and sizes of lamps the company makes. Standard incandescent and fluorescent. Heat lamps. Mercury vapor and fluorescent sun lamps. Bacteria-killing Sterilamps*. Talking lamps. Lamps to provide black light. Non-seeing mercury vapor to create photochemical reaction. The new quartz tube filled with krypton

*Reg. T. M.

with a brilliance nine times greater than the sun. On and on. And others still to come.

With a glow of satisfaction, this research specialist would revel in the way research has expanded the applications of a lamp. And with due pride.

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GEOPHYSICS

Sun to Earth Energy Link

Discovery of a layer of "excited" oxygen molecules in the ionosphere may lead to better long-range weather forecasting. This is the fourth main layer found.

➤ A HITHERTO unknown layer of "energetic" oxygen molecules in the earth's upper atmosphere, has been discovered by Dr. Joseph Kaplan, University of California at Los Angeles physicist.

It may prove to be one of the most important links in the chain along which solar energy passes in its journey from sun to earth, he says.

Lying in the ionosphere near the regions of the colorful aurora borealis and the softer greenish glow of the light of the night sky, this layer of "excited" molecules may be an important factor in the sun-powered earth's weather factory, thinks Dr. Kaplan. It also may perform a vital function in the extensive processing that solar energy undergoes before it reaches the earth.

Further investigation in this unexplored region may pave the way for accurate long-range weather forecasting, states the UCLA physicist. Learning what this region does with the enormous amounts of energy thrown out during sunspot activity may enable meteorologists to chart out weather months in advance.

Strangely enough, this new layer was first discovered not by rockets probing the vast reaches of the upper atmosphere, but in a bottle in a secluded laboratory at UCLA.

Several years ago Dr. Kaplan first noted in a specially designed quartz bottle, in which gases were excited by electrical discharges, a new form of nitrogen molecule. Recently he discovered in the same bottle a similar form of oxygen. He called these molecules "energetic" or metastable nitrogen and oxygen molecules.

Considering the conditions under which these molecules were produced, he reasoned that a layer of such molecules existed in the upper atmosphere where these conditions were duplicated.

Current spectroscopic studies of the upper atmosphere by Dr. A. B. Meinel at the University of California Lick Observatory indicated verification of Dr. Kaplan's discovery.

The new layer is the fourth main layer to be discovered in the ionosphere, the region of the atmosphere that bounces back radio waves. Previously discovered layers are the E layer and the F1 and F2 layers, whose average heights are 70, 125 and 150 miles, respectively.

At present there is no way of knowing exactly where the new layer is located. "However, our knowledge of the conditions it takes to produce these particular molecules leads us to believe that it is located just below the ionosphere's E layer and just above the ozone layer, probably about 60

miles above the earth's surface," Dr. Kaplan says.

Temperatures at this height are almost zero degrees Centigrade, and the infra-red intensity is much more than had been previ-

ously supposed at this altitude.

Until the discovery of the new layer the ozone layer beneath was credited with being the sole shield that protected us from lethal ultraviolet rays. Now it is thought that much of the ultraviolet radiation is transformed to infra-red radiation in the newly-discovered layer above the ozone.

"We are now branching out from the laboratory phase of study of this new layer," Dr. Kaplan says. "As we probe it with rockets and other research tools, we may find that it is the missing link needed to fill out the puzzling chain of solar-terrestrial relationships."

Science News Letter, November 12, 1949

BIOCHEMISTRY

Cobalt Essential to Life

➤ COBALT is one of the most essential elements in the very fundamentals of life processes and the cobalt-containing anti-pernicious anemia vitamin B-12 is the most powerful factor in the health of living things, ranging from man to the green scum on ponds.

This was indicated by Dr. S. H. Hutner, of the Haskins Laboratories, New York, to the American Philosophical Society in Philadelphia.

In experiments with one-celled algae he

has shown that cobalt enters into the molecules of the B-12 vitamin, which in turn is concerned with the manufacture of desoxyribonucleic acid that is used by the bearers of heredity, the minute genes, which provide the life chain in reproduction.

We know much less about the metals requisite for life in trace amounts than we know about the organic constituents of living things, Dr. Hutner said. Iron, manganese, zinc, and copper, in addition to cobalt, are known to be necessary to both ani-



INSTRUMENT MAST FOR FLIGHT DATA—This needle-nosed "spear" probes the atmosphere ahead of high-speed research planes to give instant telemetered readings of air speed, yaw, angle of attack and temperature. It was developed by G. M. Giannini & Co., for Northrop Aircraft, Inc., and is undergoing tests now, being the first all-electric instrument mast to be designed for this use.

imals and plants, while molybdenum, boron and possibly other metals are needed by plants and possibly by animals.

The green alga known as *Euglena gracilis* corresponds to human beings in

its need for various elements, Dr. Hutner said, and it can be used as a test animal for assaying the amount of vitamin B-12 and the effectiveness of liver extract.

Science News Letter, November 12, 1949

NUCLEAR PHYSICS

Giant Atom Smasher

See Front Cover

➤ A GIGANTIC machine with powder-puff nuclear punch has demonstrated for the first time in actual practice that multi-million dollar cosmic ray atom-smashers being financed by Uncle Sam will deliver the goods.

The machine is a quarter-scale model of the 6,000,000,000 volt bevatron now under construction at University of California Radiation Laboratory with Atomic Energy Commission funds.

Though only a model and capable of firing protons to only 6,000,000 electron volts, this machine is the biggest atom smasher yet. It has a near-oval magnet and accelerating chamber 25 feet in diameter, as shown on this week's cover of the SCIENCE NEWS LETTER. The path over which protons travel in one trip around the chamber is 100 feet, by far the longest in atom-smashing history.

Prof. Ernest O. Lawrence told University regents that the machine operates with efficiency "equalling our most optimistic advance estimates." The model proves that the revolutionary principles incorporated in the bevatron are practicable. Further experience gained will speed up the shake-down of full scale machine by many months. It will also make it possible to start the machine at 3,500,000,000 electron volts instead of 1,400,000,000 electron volts. The conversion to 6,000,000,000 electron volts will be only one stage further. The

completion of the full scale machine is four years away.

The model simulating the conditions of the big machine operates as follows: A ten-ton cyclotron, reminiscent of early ones, acts as injector, firing 20 bursts of protons a minute into the chamber at three-second intervals. An electrode in the chamber speeds protons up each time around. As protons gain energy, magnet strength is increased to keep them from straying out of their orbit. Also the frequency of the electrode pushes is slowed down to match a slight lagging tendency of the protons at higher energy. During the two-tenths of a second the protons are in the chamber they make 150,000 trips around the chamber, traveling 10,000 miles. Each burst of protons contains 100,000,000 particles.

The full scale machine is now being constructed. It will duplicate in the laboratory the cataclysmic atomic disintegrations now achieved only in the medium energy range of cosmic rays. And it will give physicists a better handle on the still mysterious force which holds nuclei together. A 3,000,000,000 electron volt accelerator is also being built at Brookhaven.

Science News Letter, November 12, 1949

PHYSICS

See Atoms and Sun As Future Energy Sources

➤ THE atom and the sun will be the source of our energy in the future, when the

world's coal and oil supplies are exhausted, Dr. Farrington Daniels of the University of Wisconsin, predicted.

Speaking before the University of Michigan chapter of the Society of Sigma Xi, national society for the encouragement of scientific research, he stated that direct use of sunlight as a power source, though simpler politically than the use of atomic energy, was more difficult technically. Dr. Daniels recommended coordination of all the research work on utilization of solar energy.

Science News Letter, November 12, 1949

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For what work was the Nobel Prize in physics awarded? p. 310

ARCHAEOLOGY

An American "Iron Age"?

Iron objects found in prehistoric sites in this country have raised the question did America have iron before Columbus?

➤ DID pre-Columbian "First Families" of Virginia and Ohio know how to smelt iron and make nails, horseshoes, and tools of iron?

The controversial question of Viking discovery and penetration of America is raised anew by chemical, spectrographic and metallographic study of iron objects found in prehistoric sites near Clarksville, Va., and in the mounds near Columbus, Ohio.

Composition of the iron, the method of carburizing the outer surface, as well as the way of forming the implements make some experts feel sure that they are not of modern manufacture.

Interested in determining just how ancient these iron objects may be is Capt. A. H. Mallery, Washington industrial engineer, who has devoted a large share of his time for many years to the pursuit of his hobby, which is tracing evidence for Viking and perhaps even earlier cultures in America before the time of Columbus.

Capt. Mallery, who has skippered ships in northern waters, has collected specimens of ancient iron from Greenland, Labrador, Newfoundland, as well as from Virginia and from the Ohio mounds.

Samples of this material have been sent by Capt. Mallery to the National Bureau of Standards and to Battelle Memorial Institute, Columbus, Ohio, for metallurgical study. Experts at both the National Bureau of Standards and at Battelle have found that the specimens are definitely not modern, although it is difficult to assign a precise date to them because no articles of comparable antiquity of known date are available for comparison.

Dr. George A. Ellinger of the National Bureau of Standards believes the specimens found in the Ohio mounds to be definitely pre-colonial. Dr. A. M. Hall, of Battelle, found that a shovel from Ohio that he tested was not modern, it could be of colonial times or it could be older. A mineral coating formed on the surface of the tool as result of the soil in which it lay buried could account for its having been preserved for a great length of time, Dr. J. C. De Haven, of Battelle, said.

The Virginia site was found when archaeologists of the River Basin Surveys of the Smithsonian Institution combed over the area in southern Virginia and northern North Carolina to salvage any possible archaeological remains before the area should be flooded by the Buggs Island Reservoir and dam.

Stone points were found there that were made by a Folsom culture people. These points were like those found in the west-

ern part of the United States and believed to be 10,000 years old.

In the same area there were found scattered over considerable land, bits of iron, nails, horseshoes, hinge fragments and occasional tools. One specimen from this find was submitted by the Smithsonian to Dr. Ellinger for evaluation. Detailed study revealed that it was not made within the last 200 years.

Early history of the region does not reveal any mention of a colonial iron furnace or smelter there, the report states.

Later, Capt. Mallery, digging on the same site, unearthed an ancient iron furnace of a design which he says was like one found in Belgium that dates back to the time of the Romans. In the Virginia furnace he found slag and about 40 pounds of iron fragments which he found to be similar to those found in and near the Folsom sites by J. V. Howe, gunsmith who lives on the site, in connection with the Smithsonian study.

Analysis of the slag, Capt. Mallery reports, shows a 60% iron content, pointing to the antiquity of the methods used. Modern and colonial slag contains less than one half of one per cent of unrecovered iron, he says.

Capt. Mallery has compared the nails

found on the Virginia Folsom site with iron nails dug up at the old Jamestown colonial settlement. They differ markedly in shape, he reports. On the other hand he finds them markedly like the rivets used by Vikings for holding together the oak planks forming the hulls of their boats. They are of a soft iron that could be hammered cold because hot iron would set fire to the wood and make the rivet loose. Similar nails, he says, were recovered from the so-called Oseberg ship which is dated at 600 A.D.

The finding of this ancient iron opens up the whole question of whether America did have an "Iron Age" before the Spanish and English colonists brought iron tools and weapons with them to the New World. Archaeologists have long believed that iron was unknown on this continent in pre-Columbian days.

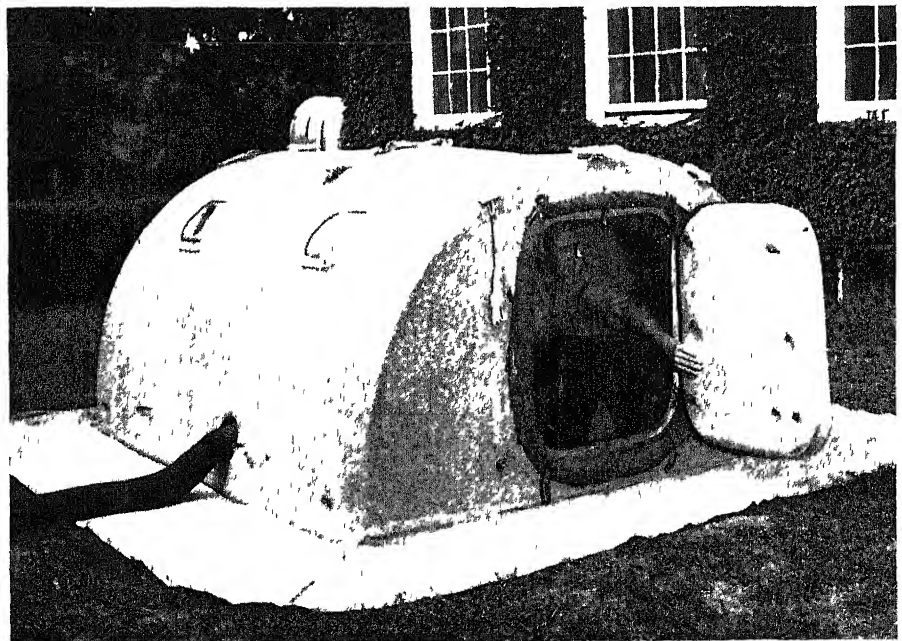
Science News Letter, November 12, 1949

ENGINEERING

Air Pressure, Not Braces, Support Quonset Hut

➤ A FOUR-MAN quonset hut, for use by stranded airmen in the Arctic, is made of cotton fabric, has no frame but can be put up with a hand air pump, it was revealed at Wright-Patterson Air Force Base, Dayton, Ohio. It is a development of the Air Force in conjunction with the U. S. Rubber Company.

The structure has no internal braces. It is supported in upright position by air pressure on the inside. Some 15 pounds pressure is all that is needed. It is made



QUONSET FOR ARCTIC—This shelter for stranded airmen unfolds from a compact bundle when blown up with a simple hand pump.

of inch-thick, two-layer cotton fabric coated with a low-temperature Neoprene compound that will withstand extreme cold

The dead-air space between the two layers provides the insulation

Science News Letter, November 12, 1949

NUCLEAR PHYSICS

Meson Predictor Nobelist

➤ THE 1949 Nobel Prize winner in physics, Dr Hideki Yukawa, predicts that there may be many more elementary particles similar to the meson which he won fame by predicting. The Japanese physicist predicted an elementary particle 200 to 400 times as heavy as the electron in 1934, three years before it was found in experiments with cosmic rays.

Dr Yukawa also predicts that these heavier "tau mesons" will be 800 to 1000 times as heavy as the electron, but will be extremely hard to detect experimentally because they live only one one-hundred-billionth of a second.

The original meson was predicted in 1934 as a means of explaining the attraction between protons and neutrons in the nucleus of atoms. When the predicted particle, with a mass 285 times the mass of the electron, was discovered in 1937, one of the names suggested for it was "yukon" in honor of Dr Yukawa. "Meson", the name finally selected, was chosen because the particle is medium weight, heavier than the electron but lighter than the proton.

It was early suspected that the meson was more than one particle, and this suspicion was confirmed in 1947 by the discovery in cosmic rays of a slightly heavier meson 315 times heavier than the electron. It was called the π meson. π mesons act as the binding force in the nucleus, as Dr Yukawa originally predicted, and they decay into the lighter mu mesons, which were discovered in cosmic rays earlier, in 1937.

π and mu mesons have either positive or negative charges. There is also evidence for a neutral meson with a mass close to that of the π meson.

At the present time, this extremely active branch of theoretical physics suffers from too many possible mesons. All may be predicted from different variations of the theory which Dr Yukawa helped to develop, but physicists cannot yet say which theory is the right one. It will be very difficult to find the whole family of these elusive particles by experiments alone because most of the heavier mesons, if they do exist, must decay too quickly to be observed by any of the methods now in use.

Science News Letter, November 12, 1949



DR. HIDEKI YUKAWA

to flow unimpeded for hours.

This persistent current experiment—a sort of "perpetual motion"—has also been startlingly demonstrated by R. B. Scott at the National Bureau of Standards. Cooling a lead saucer to about four degrees above absolute zero, a bar magnet is brought close to the saucer. This sets up an electric current in the lead which resists the further movement of the bar magnet toward the saucer. The magnet then floats above the saucer, literally suspended by nothing, like the legendary Mohammed's coffin.

So far no practical application of this achievement has been developed, but it is considered of great interest in understanding the properties of matter at very low temperatures. Some engineers have visualized transmission of electrical power with little loss over wires if they could be cooled down to the very low superconducting temperatures, which are far below ordinary frigid temperatures.

Science News Letter, November 12, 1949

CHEMISTRY-PHYSICS

Low Temperature Study

➤ THE lowest temperatures ever reached by man, less than one one-hundredth of a degree above absolute zero, corresponding to 459.6 below zero on the Fahrenheit

scale, are due to the researches for which Dr. William F. Giauque of the University of California won the 1949 Nobel prize for chemistry.

One of the world's pioneers in low temperature research, Dr Giauque proposed over 20 years ago the method of cooling below the temperature of liquid helium that uses what is known as the "adiabatic demagnetization of paramagnetic salts."

Dr Giauque is planning a laboratory at the University of California which will contain the most powerful magnet in the world. For extending his low temperature researches, under the sponsorship of the Atomic Energy Commission and the Office of Naval Research, he hopes to build a one-hundred thousand gauss magnet. A gauss is a unit of magnetic attraction.

Before the award of the Nobel prize to Dr Giauque, the University of California had earmarked half a million dollars for construction of the building in which the low temperature laboratory will be housed.

The most powerful magnet now in existence is a 40,000 gauss magnet at Leiden, in Holland. It was there that the first low temperature experiments were conducted about 40 years ago, including a test during which an electrical current was made



DR. WILLIAM F. GIAUQUE

CHEMISTRY

\$25,000 Prize Announced For New Facts on Sugar

➤ ONE of the largest prizes of the scientific world, \$25,000, will be awarded again next year in recognition of new knowledge about sugar or other carbohydrates, Dr Hailow Shapley, chairman of the National Science Fund of the National Academy of Sciences in Washington, has announced.

The 1950 grand prize of the Sugar Research Foundation Inc., will be open for entries until Feb. 1. Scientific studies of sugar in living processes, as a food and as industrial raw materials, are being stimulated by the award. Four previous prizes annually have been given.

Science News Letter, November 12, 1949

MEDICINE

Hormones Aid Cancer Ills

Temporary improvement was noted in six patients with cancerous diseases after treatment with the scarce hormones, cortisone and ACTH.

➤ SIX patients with cancerous diseases, leukemia, Hodgkin's disease and lymphosarcoma, have gotten better, at least temporarily, thanks to treatment with the two new but scarce hormone chemicals, cortisone and ACTH. These are the hormones which have won wide acclaim for their beneficial effects in rheumatoid arthritis.

Two more patients with cancer itself, one in the breast and one in the prostate gland, have been given ACTH treatment and may have been helped by it, though there was no obvious response to the treatment.

These trials of cortisone and ACTH were reported by Drs. O. H. Pearson, L. P. Eidel, Rulon W. Rawson, Konrad Dobner and C. P. Rhoads of the Sloan-Kettering Institute and Memorial Hospital, New York, at the meeting of the American Cancer Society in New York.

None of the patients was cured. None had a "complete clinical remission," the doctors reported, meaning that none was entirely well even for a temporary period. But two patients with lymphatic leukemia who had relapses when the hormone treatment

was stopped improved again when given a second course of treatment.

The hormone chemicals were given four times a day for from 18 to 30 days. In the six patients with lymphomatous tumors, there was "a dramatic and progressive decrease in the size of enlarged lymph nodes of enlarged spleens" while they were getting ACTH or cortisone. Definite shrinkage of lymphoid masses was first apparent after three days of ACTH and six days of cortisone. Two of these six patients, one with lymphatic leukemia and one with lymphosarcoma, have shown no sign of regrowth of abnormal masses within a period of 10 weeks since the ACTH was stopped.

None of the patients was critically ill when the treatment was started. All of them noticed an increasing feeling of well-being during the first two weeks of the treatment, and an increase in appetite during the first week.

"In three patients hunger became a major complaint," the doctors reported.

All of the patients noticed muscular weakness after two weeks of the treatment

and all developed edema, or dropsy, which rapidly disappeared after the treatment was stopped. One female patient developed a severe acne on her face, arms and trunk which persisted for several weeks after the ACTH treatment was stopped. She also had an increased growth of hair on her face, but no other signs of masculinizing effects.

The great scarcity of ACTH and cortisone, with no hope for any increase for perhaps years to come, was stressed by the physicians and by representatives of Armour and Company and Merck and Company which make ACTH and cortisone respectively.

Even if and when more of the chemicals are available, great care will be needed, the doctors pointed out, to avoid side effects which may include severe nervous disorders and the condition known as Cushing's syndrome. This is characterized by water retention and dropsy, a moon-like face, buffalo neck, marked increase in blood pressure, growth of beards on women and diabetes.

The reason for trying these two chemicals and hoping they might be effective in cancer and cancerous diseases is that previous studies have shown a relation between cancer and disturbance of the adrenal glands. Cortisone is a product of the adrenal glands and ACTH is a pituitary gland hormone which stimulates the adrenals to produce cortisone.

Science News Letter, November 12, 1949

ENGINEERING

Glare and Heat Reduced By New Automobile Glass

➤ LESS glare and heat are promised with a new glass for automobile windshields and sidelights developed by Libbey-Owens-Ford Glass Company, Toledo, Ohio. It is a safety plate glass with a slight bluish-green tint derived from chemicals mixed with the raw materials in manufacture.

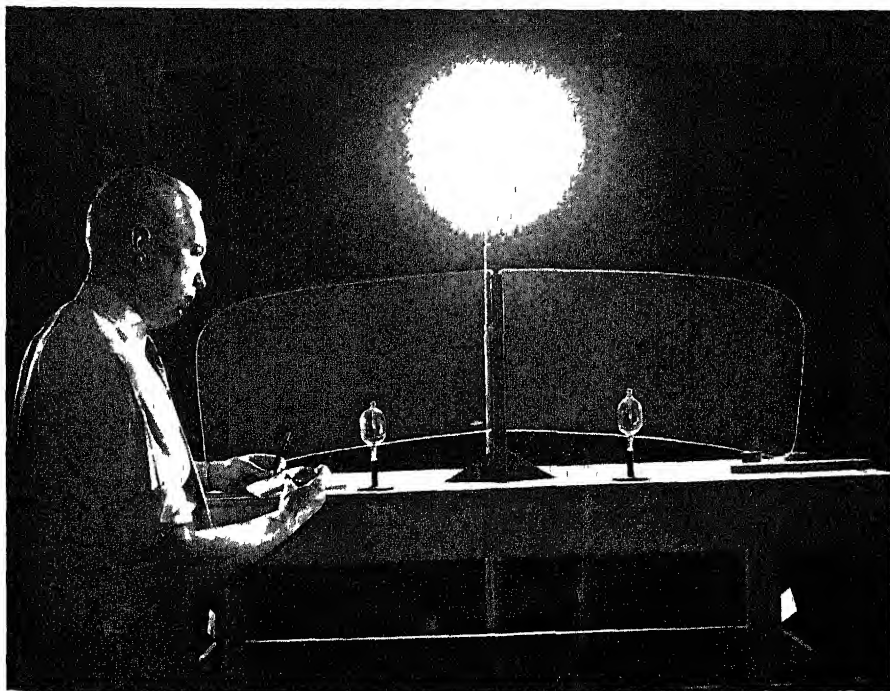
This new glass kills much of the glare that comes from bright sunshine in the daylight sky and thus reduces driver's eye fatigue, it was stated by G. P. MacNichol, Jr., of the company's staff. The ability of the glass to reduce the input of heat rays is a helpful contribution to comfort of driving on hot sunny days. Tests showed the glass reduced infra-red transmission by 15% or more. It also reduces upholstery fading by shutting out a large percentage of ultraviolet rays.

Science News Letter, November 12, 1949

As a rule, *moths* fly only at night and *butterflies* only in daytime.

Extreme altitudes are sometimes measured by the changing boiling point of a liquid with changes in pressure.

The *Virgin Islands*, with 133 square miles of area, cost the United States about 35 times the total paid for Alaska which has 586,400 square miles.



GLASS CUTS GLARE AND HEAT—The comparative heat from an artificial sun coming through the new windshield glass on the left, is being measured and compared with that which comes through the ordinary safety plate glass on the right.

MEDICINE

Plastic Sponges Fill Hollow Lung Cavity

➤ PLASTIC sponges now on the market for washing faces, dishes and even the family car may turn out to be just what the doctor orders for a patient who has had a lung removed because of disease.

Preliminary tests at the Mayo Clinic, Rochester, Minn., show the plastic sponge to be "the most promising material yet studied" for a permanent fake lung to fill the space left in the chest when a lung is removed.

In such cases the body tries to wipe out the space by a raising of the diaphragm, a shift of the partition between the lung sacs, narrowing of the spaces between the ribs and over-expansion of the remaining lung tissue. Usually these changes do not cause any serious disturbance or disability, especially in young people. But in cases where the operation has been performed for tuberculosis, the over-expansion of the remaining lung tissue is not so good. And cancer of the lung, chief condition for which an entire lung is removed, occurs most often in older patients who do not have very elastic tissues and consequently can stand least well the over-expansion of the remaining lung.

A bag of plastic material (polyethylene film) filled with spun glass and air and a hollow, lung-shaped job of a molded methyl methacrylate plastic had previously been tested. Both were satisfactory in some respects but the polyethylene bags eventually broke and the plastic molds did not fit the lung cavity well.

The plastic sponge is trimmed with surgical scissors to fit the space left when the real lung is removed. It is then moistened with a solution of salt containing penicillin and then stitched to the lining of the chest wall. The sponge itself is derived from formalinized polyvinyl alcohol and sold under the tradename, Ivalon.

Trial of these sponges in dogs was successful enough to warrant their use in selected human patients, Drs. John H. Grindlay and O. Theodor Claggett reported at a staff meeting of the Mayo Clinic.

Science News Letter, November 12, 1949

DENTISTRY-NUTRITION

Norwegian War-Time Diet Gave Children Better Teeth

➤ FISH, carrots and potatoes instead of more artificial carbohydrate foods gave Norwegian children better teeth during the war.

Dr. Gutterud Toverud, professor of pedodontics at the Dental School of Oslo, Norway, now in this country, has reported this information to the American Dietetic Association in Denver, Colo.

Dental decay in Norwegian children decreased 60% to 80% during World War II, he found. This decrease in decay resulted

partly from the war-time diet which contained a low amount of refined carbohydrates, especially sugar and the sugar products. Norwegians also ate more of the natural foods such as fish, salted herring, potatoes, and carrots—foods high in calcium, phosphorus, iron and vitamins A, B, C and D.

Since 1945, dental decay in pre-school children has increased 30% to 40%, Dr. Toverud found. Dental examinations have been made annually since 1940 on 8,000 to 9,000 Norwegian school children, aged seven to 14 years. An even greater reduction of caries during the war years was noted in two and a half to seven-year old children, Dr. Toverud stated.

Prevention of tooth decay depends on the strong resistance of the teeth and on the small percentage of carbohydrate particles on which the bacteria in teeth crevices can act. These factors were present in Norway during the war years, Dr. Toverud explained. The minerals present in the natural foods built up good resistance of the teeth to decay, while lack of carbohydrates in the diet lessened the amount of bacterial activity.

Science News Letter, November 12, 1949

NUTRITION

School Lunches Now Served Children Overseas

➤ SCHOOL LUNCHES, such as we have here, have gone abroad, although the menus vary greatly in the different countries, Majorie L. Scott, nutrition officer of the Food and Agriculture Organization, United Nations, reported to the American Public Health Association in New York.

In the United Kingdom a complete hot meal is served to over half of the school children, she said. In addition, many children also receive milk, a program started before the war.

Belgium and the Netherlands, among others, where the custom is for the child to have all his meals at home, supply only milk during the school day.

Greece has recently started a school breakfast which consists of a cup of hot milk cocoa and a slice of milk raisin bread.

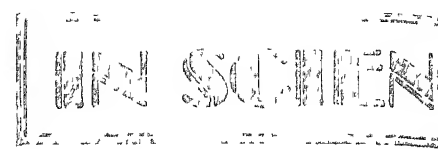
In Bangalore, India, experiments on a group of school children showed that soy products are less desirable than cow's milk in supplementing the rice diet.

School meals in Singapore, Malaya, and Java, are based on cereals such as lightly-milled rice, high extraction wheat and millets, and the small fish called pulse to provide calcium, as well as green leafy vegetables, and an oil containing carotene.

A simple snack of milk and crackers was advised, at a conference in Montevideo, for countries unable to provide full meal service in schools.

These programs are being encouraged with financial aid and technical assistance by FAO in many other regions where malnutrition is prevalent.

Science News Letter, November 12, 1949



CHEMISTRY

Mercury Vapor Poisoning Prevented by New Device

➤ AN ordinary toy balloon and a vacuum packed coffee jar are helping glass blowers in the laboratory escape the danger of poisoning from mercury vapor fumes that appear when glass vacuum apparatus is undergoing minor repairs.

Developed at the physics department of the Illinois Institute of Technology, Chicago, Dr. James J. Biophy reports in the REVIEW OF SCIENTIFIC INSTRUMENTS (Oct.), that this device has been in successful use for some time.

Two pieces of copper tubing are soft soldered to the metal cap of a vacuum packed coffee jar. An ordinary toy rubber balloon is held to one of the tubes inside the jar by a rubber band. From the other end of this copper tube rubber tubing leads to the glass blower. The other copper tube is connected to the glass vacuum system.

When the glass blower blows through the rubber tubing, the balloon expands and forces the air in the jar into the vacuum system, yet protects the blower from dangerous mercury vapor.

Glass blowers in a laboratory are highly skilled technicians upon whom the success of experiments being conducted by scientists depends. Many studies are made at much reduced pressures in apparatus containing mercury, and the danger from poisonous mercury vapor in repairing is great.

Science News Letter, November 12, 1949

OPTICS

Artificial Sapphires Are Now Made into Lenses

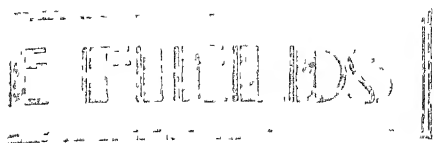
➤ ARTIFICIAL sapphires can now be made into lenses for microscopes and cameras, and it is expected that these jewel lenses will be of particular use in correcting optics for color transmission.

Dr. Robert E. Hopkins and Brian O'Brien of the University of Rochester's Institute of Optics reported to the Optical Society of America in Buffalo, N. Y., that a lens of one-inch focal length and f/15 has been constructed with two sapphire elements.

Sapphire of acceptable optical quality has been manufactured in sizes up to 20 millimeters diameter. Methods of polishing this material which is harder than glass have been worked out.

Manufacture of artificial sapphires was begun in this country during the war to provide hard and long-wearing bearings for precise instruments needed in military work.

Science News Letter, November 12, 1949



GEOPHYSICS

Picturing Earth's Shape From Gravity Differences

➤ TWO scientists at the University of Wisconsin are busy with computations which they hope ultimately will give the exact shape of the earth.

Prof. George Prior Woollard, University geophysicist, and Norman C. Harding, a graduate student, are correlating gravity measurements taken at different points on the globe by Mr. Harding and other graduate students during the summer.

Since the earth is of irregular shape, being pumpkin-shaped rather than perfectly spherical, the pull of gravity varies by minute but measurable differences. From measurements of these differences recorded from many points on the earth's surface, scientists will be able to make an exact model of the earth showing all its bumps and wrinkles.

However, it will take many thousands of such measurements and long and painstaking correlation of them before this point is reached. Prof. Woollard, who instituted the project in 1940, has traveled all over the northern hemisphere taking measurements. Mr. Harding took readings at some 400 different places throughout South America and Alaska on his expedition this summer.

Although the theoretical basis for relating earth size to varying gravitation has been known for a hundred years, it is only recently that the development of a portable, accurate gravimeter, the gravity-measuring instrument, made extensive field work possible.

Many other organizations are engaged in collecting gravity measurements all over the world. In this country, the U. S. Coast and Geodetic Survey is making an intensive study of gravity differences in the Midwest. Some day it is hoped all these figures will add up to the exact shape of the earth.

Science News Letter, November 12, 1949

NUCLEAR PHYSICS

Static Electricity Being Fought with Alpha Rays

➤ RADIOACTIVE materials are being used to fight the danger of fire from static electricity produced in many industrial operations. Dr. John E. Silson of the New York State Department of Labor told the American Public Health Association in New York.

Alpha rays, composed of the nuclei of helium atoms, have been found effective for this because they ionize the atmosphere and thus break up the static charge, he said.

But this has created a new danger to health because radium is the material used as source of the alpha rays. The danger is from the beta and gamma rays, which radium also gives off.

This danger from gamma rays can be held in check by the simple precaution of keeping workers a safe distance from the radioactive material, Dr. Silson pointed out. Shielding he called impractical because it would require great thickness of lead.

He recommended film badge monitoring which shows how much radiation is hitting the body of a worker as a check on the control measures being used.

Science News Letter, November 12, 1949

CHEMISTRY

Many Products from Fat To Come from Unique Plant

➤ HUNDREDS of products of fat, plain animal fats from meat packers and markets, are to be obtained at an unique new plant opened in a nearby Chicago suburb by Armour and Company. While glycerin will be the principal product, there will be a long list of old and new chemicals in addition.

The new plant is intended to process up to 100,000,000 pounds of fat a year. From the fatty acids obtained many products will be made by conversion into amides, nitriles, amines and other substances. Applications of products will range from better detergents for cleaning to waterproofing for concrete, improved binder for asphalt roads and for use in recovering iron from its ore.

The work of the new institution will be based on years of study of each of the acids found in fats and the various chemical variations possible for them. Edible fats have been used largely as lard and other shortening and in margarine. Inedible fats have been used mostly in soap making but they have been used also in lubricants, cutting oils, candles and a few other purposes. The present plan is to find more worthy uses for the fatty acids.

A fat molecule consists of a molecule of glycerin holding together three molecules of acid which may be all different. The types of acids depend upon the source of the fat. In this new plant steam is fed into the top of a high tower under 700 pounds pressure per square inch and at a temperature of 450 degrees Fahrenheit. Liquid fats are pumped up from the bottom. The glycerin is separated, washed out and recovered at the bottom. The mixed acids emerge from the top.

The mixed acids may be converted into amides by mixing with ammonia and heating, then into nitriles by the use of high temperatures, and finally into amines by hydrogenation. However, the various acids may be separated from each other in the high vacuum fractional distillation section of the plant, on the basis of the differences in their boiling points.

Science News Letter, November 12, 1949

PALEONTOLOGY

Prehistoric Sea Cow Skeleton Is Unearthed

➤ SCIENTISTS now have their hands on the first skeleton of a rare beast of the prehistoric world, a 30,000,000-year-old sea cow, which had been known only from fossil skull fragments and curious peg-like teeth.

The animal was the ancestor of the modern sea cow and, like his offspring, he was a stupid, ugly and ungainly beast, having an appearance something like a cross between a hippopotamus and a small whale.

Paradoxically, the sea cow appears to have inspired the creation of one of the loveliest individuals in mythology, the mermaid. True, the sea cow had a flipper, but here the resemblance ends.

The skeletal remains of the prehistoric sea cow were unearthed near the California town of Coalinga by Roy H. Reinhart, teaching assistant in paleontology. The remains will make it possible for Mr. Reinhart to make the first definite assignment of the animal's place in evolution.

Mr. Reinhart says the sea cow apparently has always been rare on the earth. Only two skulls, two partial jaws and some teeth of the prehistoric animal had been unearthed prior to the Coalinga find.

Two genera presently inhabit the earth: the Manatus along the coast of Africa and from the West Indies to central South America on the Atlantic Coast; and the Dugong from the Philippines and Australia to Madagascar and the Red Sea.

Science News Letter, November 12, 1949

BIOCHEMISTRY

Cows' Thyroid Gland Size May Be Key to Milk Yield

➤ SOUTHERN cows give less milk than northern cows, on the average. Southern cows have smaller thyroid glands than northern cows, on the average.

Dairy scientists of the U. S. Department of Agriculture, placing these two facts side by side, speculate that there may be some connection between them. Although they are not sure, they think they are on the trail of something better than a mere hunch. Here are some of the facts that make them think so.

1 Cows fed with thyroxine often give more milk.

2 Thyroxine is a substance secreted by the thyroid gland.

3 In some animals, environmental temperature is known to affect thyroid activity.

4 Diet and heredity may also affect thyroid activity.

Intensive research into the thyroids of cows in relation with their environment, diet and heredity is on foot already in the hope that some day southern cows will produce as much milk per cow as their northern cousins.

Science News Letter, November 12, 1949

ANTHROPOLOGY

Scale for Cultures Traced

A similar evolutionary pattern exists for both the Old and New Worlds. Only the actual dates of the eras, beginning with the primitive, differ.

By MARJORIE VAN DE WATER

➤ CIVILIZATION followed the same pattern of development in all the world centers of civilization. The peoples of the new world as well as those of Egypt, Mesopotamia, and China went through the same eras in their growth toward the peak of their culture.

They all began with a period in which they lived primitively on wild game and wild fruits and other foods. They reached a climax with empire building. The pattern followed in this development has been traced by Dr. Julian H. Steward, anthropologist of Columbia University.

This is the first time that a single scale has been worked out for the cultures of both Old and New Worlds. Most American anthropologists have previously attributed such similarities as have been found to cultural diffusion in some unexplained manner rather than as a natural sequence of events occurring as cause and effect in the course of a similar evolution.

Cradles of Civilization

Six world centers have places on Dr. Steward's scale of development. He chose them because they were the cradles of civilization and because culture was facilitated by the fact that all were in arid or semi-arid regions. The scale appears in *AMERICAN ANTHROPOLOGIST*.

The idea that the arid soil made farming very difficult and that the problem of living in such dry regions stimulated cultural development is a mistake. On the contrary, the dry soil facilitated culture because it was easily tilled by a digging-stick and irrigation farming.

Other parts of the world such as the tropical rain forests, the northern hardwood forests and the sodded plains areas could be tilled only with the greatest difficulty by people who lacked iron tools.

But before the people knew how to farm all these cradles of civilization went through a period of living by hunting and gathering. In those days all of man's energies had to be devoted to satisfying the biological needs for food, clothing and shelter. Simple crafts of pottery, basketry, weaving and permanent housing were unknown. This era came first in all the world centers, but the actual dates were different. In the Old World people emerged from this era much earlier than they did in the New World. The dates set by Dr. Steward, which are only roughly approximate, are 8000 B. C. for Mesopotamia,

7000 B. C. for Egypt, about 5000 B. C. for China, 2000 B. C. for Northern Peru and not until about 1500 B. C. for Middle America.

Then the Indian in Peru began to plant beans and dig himself a semi-subterranean house. In Mesopotamia the people probably domesticated millet or wheat and maybe also domesticated animals. In Egypt they may have domesticated plants and traces have been found to indicate that they did make pottery. This era lasted until about 5000 B. C. in Mesopotamia and until about 500 B. C. in Middle America.

As farming in these arid regions developed, there was a need to reckon seasons and forecast the rise and fall of rivers and other such aspects of the understanding of nature. This led to the forming of an upper class of individuals with knowledge and magic. Increasingly efficient farming made it possible for the farmer to raise more than he needed to eat himself and left a share to be contributed to the upper ruling class.

Increasing population brought a need for political integration and this led to the creation of small states ruled by the religious leaders. In the Old World, the more important domesticated animals, except the

horse, were present from early in this "formative" era. In the New World, however, the absence of suitable wild species for domestication limited such animals to the dog and in the Andes of Peru to the llama and alpaca.

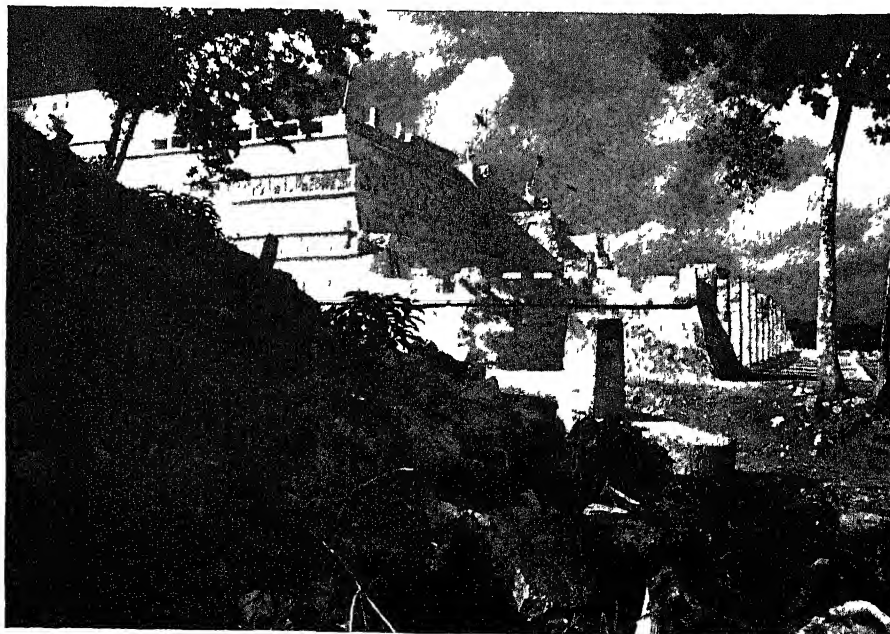
Irrigation was still on a local scale, and control of it was one of the more important practical functions of the religious leaders.

During the "formative era," all centers of civilization developed ceramics, loom-weaving, basketry, metallurgy (except in Middle America) and the construction of houses and religious edifices.

Regional Development

Following the formative era there came the era of "regional development and florescence." No new technologies were invented but irrigation works were enlarged, releasing a larger portion of the population for intellectual interests. At this time the largest religious edifices were built and the finest art and manufactures of any era were produced, each region producing distinctive styles. These products were dedicated principally to the upper classes which were still religious and to the temples.

Wheeled vehicles appeared in the Old World during this era. The wheel was used on toys in this same era in Middle America, but was not used in transportation, probably because of the lack of draught animals. Every New World center developed roads, boats and canals to a degree of efficiency which enabled them to achieve states as



NEW WORLD CIVILIZATION—The great temple of the Warriors in Chichen Itza, Yucatan, was built in the era of militarism and empire building.



OLD WORLD CIVILIZATION—A parallel in the Old World is the tomb pyramid of the Warrior King Chephren built in the same era as the Yucatan temple. An interesting feature of these military-religious edifices is that the cubic content of each is greater than that of the total of all the private dwellings of the people who built them.

large as those of the Old World

The priesthood, devoting full time to religious matters, laid the foundations of astronomy, writing and mathematics in all centers

Militarism had its birth in this era, and it was with the help of the military that the rulers were able to extend their authority over subject states and enlarge their irrigation works. A temporary decrease in population probably followed the initiation of large-scale warfare.

Then followed the era that Dr. Steward calls the era of "Cyclical Conquests." This was a time of empire building and large scale militarism. Now cities were founded in all the world centers. Trade developed within empires and even beyond, and in

some centers money was used. The principal change in manufactures was a strong trend toward standardization and mass production. In some centers there was a military class and captives of war became slaves.

Then population pressure and abuse of the common people brought rebellion, which destroyed the empires and returned society to local states and a period of dark ages. Irrigation works were then neglected and population decreased.

This empire-building era was ended in the Old World with coming of the Iron Age. In the New World it was interrupted by the Spanish Conquest. That ended the natural development of the native American culture, and pre-Columbian civilization.

Science News Letter, November 12, 1949

AERONAUTICS

Helicopter Gets Capsule

➤ A PROJECTED "capsule-carrying" helicopter will join forces with a capsule-carrying airplane to deliver freight from an airport near its source to out-of-the-way places where planes can not land. The capsule in this case is an attachable and detachable cargo compartment about the size of the body of an ordinary overland passenger bus.

The capsule-carrying plane was announced

a year or so ago by the Fairchild Engine and Airplane Corporation, Hagerstown, Md., its designer and builder. The planned helicopter capsule-carrier has just been revealed in *PEGASUS*, publication of the Fairchild company, but it is to be constructed by Piasecki Helicopter Corporation, Morton, Pa.

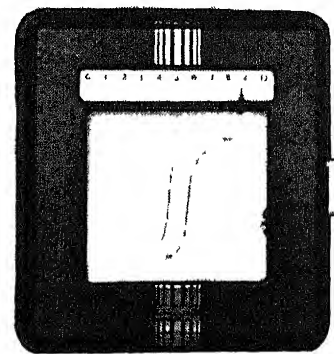
The airplane will carry the cargo compartment to the airport nearest to the final

destination, and deposit it upon the runway. The helicopter will pick it up at that point and take it, without having to reload, on the final section of its route. This could provide easy and quick transportation of needed equipment or supplies from manufacturers to users, particularly to American soldiers who, in another war, might find themselves in a hard-to-get-at location.

The carrier plane is a version of the Fairchild Packet, now widely used as a cargo ship by the armed services. In it the box-car-size cargo compartment which forms the lower part of the ordinary Packet, is omitted and the space is available for the detachable capsule. The operating part of the plane remains about the same. The main landing wheels of the new version are at the end of struts long enough to permit the plane to straddle the capsule as it rests on the runway. Mechanism is provided by means of which the capsule is raised to become the "belly" of the carrier, to which it is firmly attached.

The helicopter to be used, which will probably be ready for tests within two or three years, will also be able to straddle the capsule. It will be somewhat like the type of helicopters built by Piasecki and now in service in that it will be an elongated affair with overhead lifting and propulsion rotor blades at front and rear.

Science News Letter, November 12, 1949



Now You Can Plot X vs Y Automatically

A new Speedomax Recorder saves hours of data plotting by automatically drawing the relationship between any two variables instead of plotting just one as a function of time as done by usual recorders. The new instrument has two high speed electronic circuits—one for each axis. In other respects, it's a standard Speedomax.

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METALLURGY

Molybdenum for Jets

► THE American metal molybdenum promises to play an important part in high-speed aviation in the near future. Researches at Battelle Memorial Institute, Columbus, Ohio, show that this metal can be used more largely than at present in the construction of jet and rocket engines to operate at the extreme high heat necessary for efficiency.

The attainment of more compact and efficient power plants depends, in part, on the perfection of heat-resisting materials superior to those available today. Robert M. Parke, Battelle's specialist upon refractory metals, points out. Extensive investigations are being conducted, with Office of Naval Research support, with the primary objective of raising the usefulness of molybdenum to a level consistent with its abundance.

Present requirements for heat-resistant metals are being met largely by alloys in which iron, nickel, or cobalt are major constituents. Mr. Parke states. To make

any substantial increase in the operating temperature of the metal parts of heat engines, a metal must be selected which has a melting point greater than that of iron, nickel or cobalt. These are 2,800 degrees, 2,700 degrees, and 2,650 degrees Fahrenheit, respectively.

All metals with melting points above 2,800 degrees are either difficult to fabricate or scarce, or both. Molybdenum has a melting point of 4,750 degrees. It is abundant, particularly in the United States. Although not now easy to fabricate, it seems certain that improved methods will be found. This is one of the problems that Battelle Institute hopes to solve.

In addition to its high melting point, molybdenum has other properties which can be expected to contribute to its successful use as a heat resistant metal in aviation power plants and other applications. It conducts heat about twice as well as iron and its coefficient of thermal expansion, its rate of expansion when heated, is among the lowest of pure metals. The magnitude of these properties will aid in preventing distortion due to high heat.

One disadvantage of molybdenum is its inability to resist rapid oxidation above 1,400 degrees Fahrenheit in air. Above this temperature it forms an oxide that evaporates as rapidly as it is formed, thus giving no protection to the metal. This constitutes another problem to be solved, but solution is promised.

Science News Letter, November 12, 1949

NUCLEAR PHYSICS

New Platinum Isotope Exceeds First Find

► THOUGH you wouldn't be able to find it even on careful examination of your ring, a new isotope of platinum has been discovered.

An isotope is a substance or element having the same place in the atomic table as another but with a different atomic weight. Radioactive isotopes being produced by the atomic piles are valuable research tools, in studying cancer for instance, and many new ones have been artificially produced in recent years.

Discovery of rare, stable varieties of elements, such as this isotope of platinum, is rather unusual.

Existence of the platinum isotope of mass 190, has been confirmed by Wallace T. Leland of the physics department of the University of Minnesota. He found, however, a greater abundance than was reported by the original discoverers, Dr. H. E. Duckworth, Robert F. Black and Richard F. Woodcock of Wesleyan University, Ohio.

The new isotope was found by examining in a mass spectrograph vapor obtained by

the evaporation of platinum from a heated filament covered with platinum. Its abundance is about one part in 10,000, instead of one part in 16,000 as previously reported.

Science News Letter, November 12, 1949

Words in Science—AC—DC

► ELECTRIC current is a flow of electrons. It is a continuous flow which may be all in one direction or back and forth.

When the electrons flow through the wires in one direction around the circuit, the current is called DC, which means "direct current." It is incorrect to speak of DC current, because the C in DC means current.

In AC—alternating current—the electrons move back and forth. But in most applications of electricity, it is not the electrons that are wanted at the far end of the line, but power and energy. There are plenty of electrons there already.

A wire, any metallic conductor, is full of electrons. All that is needed is to set them in motion.

The alternating current transmits a motion of the electrons, not the electrons themselves.

Science News Letter, November 12, 1949

DEAF?

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by Alex Osborn

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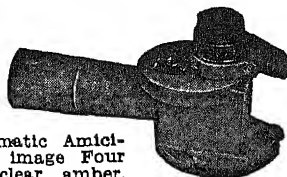
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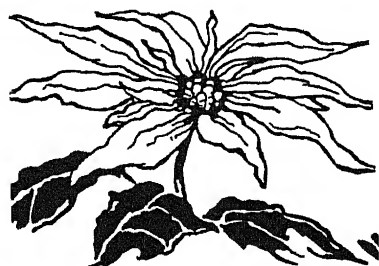
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Poinsettia Pointers

➤ NOVEMBER is a critical time for poinsettias. Whether this festive plant will lend its flaming red bracts to the brightness of the Christmas season depends largely on how well it is spared certain pre-Christmas hazards.

Poinsettia goes by a variety of names.

Christmas Flower, Easter Flower, Lobster Flower, Mexican Flame-Leaf. It grows wild in moist, shady areas of Mexico and Central America. In the tropics poinsettia gets short days and long nights. In the home, with electric lights and our modern habits of staying up long past the sun's bedtime, we are not likely without special effort to supply the natural rhythm of light and dark which brings out the best in the poinsettia.

To bring out this best, home-growers of poinsettia place the plant by a window so that it will get the maximum of November daylight. At night they cover the plant with a dark cloth, in much the same way that a canopy might be put to sleep for the night.

Poinsettia, in addition to being light-sensitive, is very susceptible to extremes of heat and cold. For this reason, another farsighted precaution is to maintain an even temperature in the room. Draughts or sudden temperature drops may cause the foliage to drop. Weekly applications of liquid manure are also helpful.

Of all these measures to induce the bright-

est display by Christmas, the most important is the regulation of light. Scientists of the U. S. Department of Agriculture have found that as little as an hour's exposure to minute quantities of light nightly for three weeks is enough to prevent flowering.

The red bracts of poinsettia are actually one of the two kinds of leaf that the plant produces. The other, of course, is the glossy dark green leaf that contrasts with the bracts in the traditional cheerful Yuletide colors. The flowers proper are tiny club-shaped objects at the center of the red bracts.

There is a large group of plants that share this distinctive manner of flowering which goes under the botanical name, euphorbia. One of these, a thorny type that is plentiful in Palestine and in the Mediterranean region, is prominent in the Christmas tradition of England. This is the famous Glastonbury thorn, reputed to be the staff of Joseph of Arimathea which he planted on the site of Glastonbury Abbey, and said to blossom only at Christmastide.

Science News Letter, November 12, 1949

GEOLOGY

Study Coral Reef Origin

➤ MUCH battered Bikini, the A-bomb atoll in the Pacific, may once more become a proving ground, but this time to test out various geologic theories of the origin of coral reefs.

By drilling a hole 7,000 to 10,000 feet deep into the coral foundation, geologists hope to solve the mystery of the origin of such formations concerning which several conflicting explanations have been advanced since 1820 when coral reefs were first observed scientifically.

If funds needed in addition to those already offered by the Geological Society of America and the Office of Naval Research can be raised to finance the project, Dr. H. S. Ladd and J. I. Tracey, Jr., of the U. S. Geological Survey, believe that much more will be gained besides the settlement of the 130-year old controversy. Such a deep-drilled hole, they write in the *SCIENTIFIC MONTHLY* (Nov.), "would give valuable information on many fundamental geologic problems," among them the composition of the strata and the kinds of animal and plant life that inhabited the region ages ago.

Although all scientists agree that coral is the limestone skeleton of one of the lowliest creatures of the animal kingdom which slowly builds up into large formations over long periods of time, they have been unable to agree, Dr. Ladd and Mr. Tracey say, on an explanation of how these coral islands could grow so enormous as to project above the level of the sea.

Charles Darwin, the great 19th century founder of the theory of evolution, believed that coral reefs and atolls have formed on land that is slowly sinking into the sea. Carl Sempel, a contemporary of Darwin,

proposed the contrary view that the foundation of coral isles was slowly rising from the ocean bottom. In 1910 R. A. Daly suggested that during the Ice Ages the sea was much lower and the coral began to form when the banks were close to sea level.

Although modern students of the problem have gained much knowledge of coral structure by extensive geophysical, chemical and magnetic surveys, Dr. Ladd and Mr. Tracey point out that they still do not have enough evidence to decide which of the conflicting theories is correct.

Science News Letter, November 12, 1949

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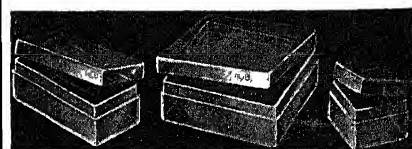
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CALCULATING INSTRUMENTS AND MACHINES—Douglas R. Hartice—*University of Illinois Press*, 138 p., illus., \$4.50 Intended as a general introduction for those with no specialized knowledge.

CATALOG OF THE TERMS (ISOPHRA) OF THE WORLD—Thomas E. Snyder—*Smithsonian Institution*, 490 p., paper, \$3.00 The first modern catalog of the group.

CHEMICAL CALCULATIONS FOR FIRST YEAR STUDENTS—H. Stephen and S. S. Isaacson—*Edward Arnold*, 2d ed., 115 p., \$1.50 Intended to be used in conjunction with lectures and laboratory work. The authors are at the University of Witwatersrand.

CHILDHOOD & ADULT Some Essays and Clinical Studies—Susanne Isaacs—*International Universities Press*, 245 p., \$1.50 A collection of studies, partly technical psychoanalytical papers and partly on applications in the bringing up of children.

CHILDREN IN CONFLICT Twelve Years of Psycho-

analytic Practice—Madeline I. Rumbaut—*International Universities Press*, 214 p., illus., \$3.25 Revealing to parents what happens behind the closed door of the examining room when they take their child to a psychoanalyst and also what happens during the emotional development of the child. Foreword by Jean Piaget.

THE COMMUNITY OF MAN—Hugh Millar—*Macmillan*, 169 p., \$3.00 A philosophical work in which the author expresses the belief that the political economies of the USSR and the USA can associate.

FROM THE PART II TO THE MOON AND A TOUR OF THE MOON—Jules Verne—*Didier*, 1st ed., 256 p., illus., \$2.95 An old classic in new dress.

IONIZATION CHAMBERS AND COUNTERS: EXPERIMENTAL TECHNIQUES—Bruno Rossi and Hans H. Staub—*McGraw-Hill*, 243 p., illus., \$2.25 This volume of the National Nuclear Energy Series deals with the fundamental features of ionization and describes the construction of some typical detectors and their operations.

MAN AND THE MYSTERIOUS UNIVERSE—Brynjolf Bjorset—*Philosophical Library*, 174 p., \$3.75 Thoughts of a Norwegian who has travelled widely.

MANUAL OF SPECTROSCOPY—Theodore A. Cutting—*Chemical Publishing Co.*, 220 p., illus., \$6.50 Written to assist those who wish to analyze ores and inorganic chemicals. Includes instructions for making an effective spectroscope.

THE NBS-NACA TABLES OF THERMAL PROPERTIES OF GASES Table 210, Dry Air, Table 910, Molecular Oxygen, Table 1110, Molecular Nitrogen—Harold W. Woolley—*National Bureau of Standards*, each 4 p., paper, free upon request to publisher by investigators having need of them.

PAVLOV A Biography—B. P. Babkin—*University of Chicago*, 364 p., \$6.00 Written by a pupil and associate of Pavlov, this book presents an account of his methods and discoveries.

THE PSYCHOANALYTIC STUDY OF THE CHILD, Vol. III-IV—Phyllis Greenacre and others, eds—*International Universities Press*, 493 p., \$10.00 For those dealing with psychopathology in childhood. The twenty-one papers in

this volume present a compilation of the latest psychoanalytic ideas on child study.

REVIEW OF CURRENT RESEARCH AND DIRECTORY OF MEMBER INSTITUTIONS 1949—*Engineering College Research Council*, 186 p., paper, \$1.75 Over 4,000 current college and university research projects in engineering are included.

THE RIVERS OF MISSOURI—Dan Saults, Ed.—*Missouri Conservation Commission*, 100 p., illus., paper, 25 cents Life along many beautiful rivers including the great Missouri and Mississippi.

SHIRAZ PAINTING IN THE SIXTEENTH CENTURY—Grace Dunham Guest—*Smithsonian Institution*, 70 p., 50 pl., \$5.00 A study of paintings in the collection of the Freer Gallery of Art.

SOCIAL STRUCTURE—George Peter Murdock—*Macmillan*, 387 p., \$6.00 Based on data from the Cross-Cultural Survey files supplemented by material on 165 additional societies to cover information on family, kinship, local groups, and marriage and sex behavior.

VARIETIES OF DELINQUENT YOUTH An Introduction to Constitutional Psychiatry—William H. Sheldon—*Harper*, 899 p., illus., \$8.00 A report based upon a ten year study of delinquent youngsters in the Haydon Goodwill Inn, a Boston social agency. Dr. Sheldon's thesis is that a human being's behavior and personality are closely related to the structure of his body, and through reviewing the lives of 200 boys he tries to establish this.

Science News Letter, November 12, 1949

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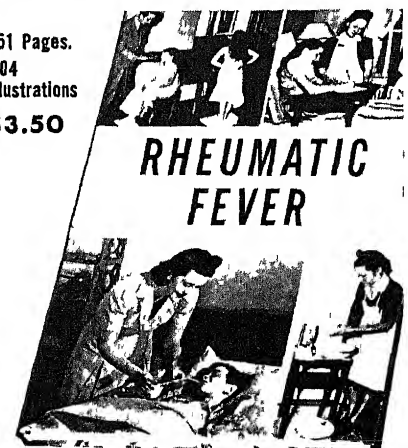
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⚙️ **STEAM IRON** for laundry work is a regular lightweight electric dry iron to which is attached a bulb-shaped four-ounce plastic reservoir. This fits on the back of the iron and makes instantaneous steam when the iron is flat on the ironing-board. Steam or dry ironing is obtained by a turn of a knob.

Science News Letter, November 12, 1949

⚙️ **ELECTRIC WORMER**, to get but without digging, is a rod-like device pushed into the ground and connected to an electric outlet. It can be used attached to an automobile engine spark plug if iron wire is wrapped around the car bumper and the other end stuck in the ground to complete an electric circuit.

Science News Letter, November 12, 1949

⚙️ **SANDING DEVICE** for use on automobiles to give traction on icy roads, recently patented, is built about the muffler with its bottom sloping toward the rear. Operated from the driver's seat, a valved connection between the exhaust pipe and the sand delivery tube delivers distribution pressure.

Science News Letter, November 12, 1949

⚙️ **CHRISTMAS TREE ORNAMENTS**, shown in the picture, and blocks for the youngster are made of styrene plastic in various colors and are safe objects for chil-



dren to handle. Each lightweight, transparent ball contains a three-dimensional star or a figure suggestive of the holiday season.

Science News Letter, November 12, 1949

⚙️ **FAUCET FILTER**, easily attached to the cold or hot water outlet at the kitchen sink, removes foreign matter from the water, including organic material, along with objectionable tastes and odors. It contains

several layers of fine screen, each of different mesh, and layers of taste- and odor-absorbing chemicals.

Science News Letter, November 12, 1949

⚙️ **FROSTGUARD**, to protect orchards from freezing, is a nickel-alloy kerosene burner and reflector combination, mounted on stilts between the fruit trees. By means of a special generator type burner and a combustion chamber, high heat is developed which is directed downward and outward by the reflector.

Science News Letter, November 12, 1949

⚙️ **HOSIERY-HANGER**, for drying stockings in a bathroom, is a three-inch wide plastic shelf which has slots on the front side into which the stocking toes are inserted. Fixed to the wall with two screws, the hanger is available in colors to match bathroom color schemes.

Science News Letter, November 12, 1949

⚙️ **DOG LEASH**, usable as a tethering device, has a metal stake on the outer end which can be easily forced into the ground, and a recoil spring in the leash itself cushions the shock when the animal tenses. A metal plate on the top of the stake, flush with the earth, holds it in place in spite of sidewise tugging.

Science News Letter, November 12, 1949

Do You Know?

The white starling of Java has a touch of black on its wings.

Handicapped persons in 14 states are granted some form of tax exemption.

A substitute for horsehair for upholstery comes from cows; it is a curled fiber made from casein from milk.

A scientist has recently found that a good trained dog will kill 75 field mice in an orchard in one afternoon, while a cat is playing with the one she killed.

The so-called *New Hampshire Midget watermelon*, developed at the state university, is said to combine small size with high quality and to be suitable for the New England climate.

In the fall a chemical transformation takes place in the leaf of a tree; the green chlorophyll becomes colorless and is no longer able to hide the reds and yellows and other colors as it does during the growing season.

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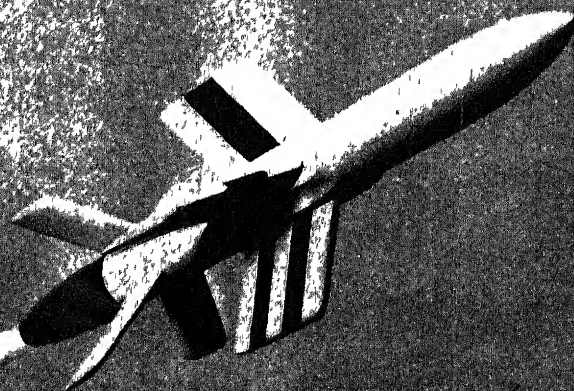
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NOVEMBER 19, 1949

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



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Plane-Launched Rocket

See Page 326

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PALEONTOLOGY

Find Fossils' Mother Lode

Hundreds of these specimens were brought back from the Colombian site where they were discovered and will be studied to learn about prehistoric times.

► THE discovery of a mother lode of fossils that will greatly expand science's picture of life in South America in prehistoric times, is described as one of the most important paleontological finds of this century. The find was reported to the meeting of the Geological Society of America in El Paso, Tex.

Results of excavations at the site, in the isolated Magdalena Valley of Colombia, were reported by Dr. R. A. Sturton, University of California paleontologist, and his associate, Robert Fields. Dr. Sturton has made three trips to the region since 1944, and Mr. Fields recently returned from there after making geological maps of the area and intensive collecting of fossils.

The find is important for many reasons, Dr. Sturton said. The fossil specimens are prolific and varied, the fossil bed is at the migrational doorway of South America, it is the first important fossil record of South America outside Argentina, and it is the first abundant record of the tropical region of South America.

The hundreds of specimens brought back will make it possible to learn much about life in the age of mammals in South America, previously unknown because few relics had been found.

The fossils include those of monkeys, rodents, snakes, lizards, birds, lung fish, the tooth of a sea cow, and giant crocodiles.

Dr. Sturton said that three types of fossils are particularly noteworthy: the monkeys, an ancient extinct guinea pig, and a condylarth, primitive extinct dog-like creature with hoofs.

Two new genera and one new species of monkey are in the collection, only the Argentine *Homunculus* previously being known in the South American fossil record. One of the monkeys was so unusual that Dr. Sturton was unable to classify it until a few days before the meeting.

The condylarth, ancestor of the modern horse, deer, camel and other hoofed animals, is believed to have become extinct about 50,000,000 years ago, but in the agreeable tropical climate of Colombia lived until 15,000,000 or 20,000,000 years ago. The rarity of this animal in the fossil bed—only part of a lower jaw was found—where other species were prolific, indicates that the condylarth was becoming extremely rare at that time.

The fossil guinea pig in question is believed to have arisen less than 10,000,000 years ago, but the Colombian specimens go back about 20,000,000 years.

The fossil bed extends over an area of about 250 square miles of the valley. In pre-

historic times a major river ran through the valley, and the animals were trapped in mudflats along the river. Today the region is arid, and thundershowers often expose fossils which lie close to the surface.

Science News Letter, November 19, 1949

BOTANY

High Yield Buffalo Grass Will Be Available Soon

► AN unusually high yield forage, a hybrid buffalo grass that is the culmination of extensive breeding experiments, will shortly be available to growers throughout the Southern Great Plains region.

Because buffalo grass has both male and female plants, unusual in range grasses, it will be necessary to raise hybrid seed and distribute it in much the same way that hybrid corn is distributed.

Dr. Jack Harlan, grass breeder at the U. S. Great Plains Field Station in Woodward, Okla., explains that he is developing the new high yield hybrids by combining the heavy forage qualities of one type with

the prolific seed-production of another type. Special breeding work has produced seedy types that are predominantly female and these are pollinated with forage types. The final selection, hybrid seed of the desired type, entails from eight to 15 crosses, he says.

Science News Letter, November 19, 1949

ARCHAEOLOGY

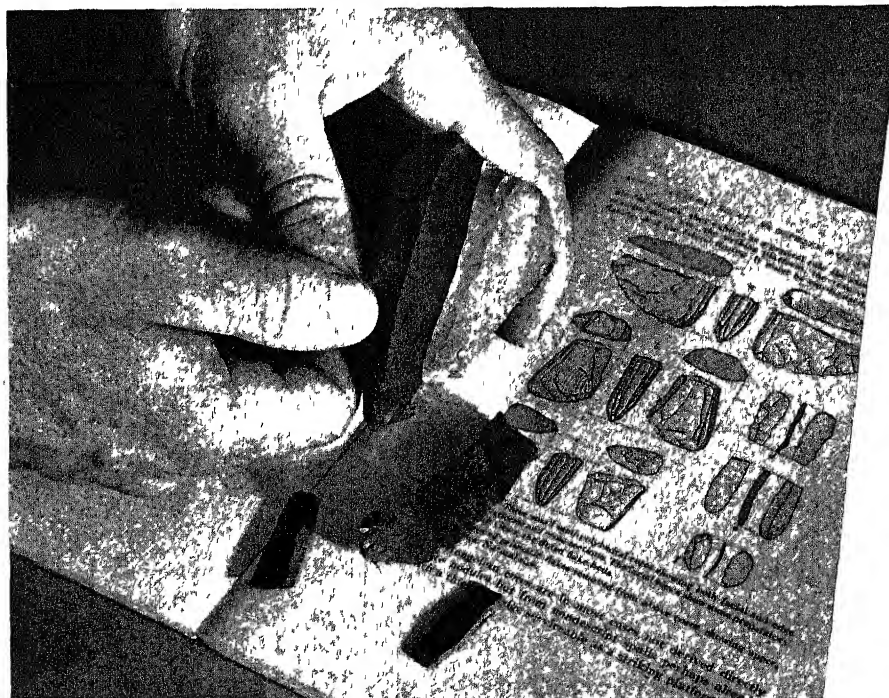
Fossil Find Shows First Americans Came from Asia

► NEW evidence that the first Americans came from Asia through Alaska has been dug from the frozen soil of the Far North by Dr. Ralph S. Solecki of the Smithsonian Institution, Washington, D. C.

Exposed by centuries of erosion on an Alaskan mountain top, Dr. Solecki made the lucky find of some curious stone implements. Importance of the discovery lies in the fact that they are just like some found previously on the other side of the world in the Gobi Desert. These Gobi Desert implements have been identified as used by a primitive people who lived in Mesolithic times, between the Old Stone Age and the New Stone Age.

Dr. Solecki's finds were made in an area that was never glaciated and which probably some 10,000 years ago formed part of an ice-free corridor through which the first Americans may have passed during their long trek from Asia to their final home in the New World.

Science News Letter, November 19, 1949



LINKS EAST AND WEST—This stone implement found in the soil of an Alaskan mountain is just like some found previously in the Gobi Desert and identified as made some 10,000 years ago.

MEDICINE

Restoring Sight, Sound

Based on nerve research now in progress, prediction was made that stimulating the brain electrically would restore sight, hearing and motion to the disabled.

► MAKING the lame walk, the blind see and the deaf hear will come out of the realm of miracles and into everyday life when brain and nerve research now under way reaches its goal

Some of the research which, in theory, makes possible this prediction was reported by Prof. Wendell J. S. Krieg of Northwestern University Medical School at a meeting at the University's campus in Evanston, Ill.

Electrodes placed in or on the brain, to stimulate by electrical impulse the motor points of muscles or the seeing and hearing points of the brain, are the means which Prof. Krieg believes will accomplish the miracles

A person who has become blind may again obtain the sensation of light if a point at the back of the brain is stimulated electrically, he said. If a number of electrodes were distributed over the surface of the brain in a prearranged pattern or sequence, the person might perceive outline or movement. He could read if single letters were transmitted one at a time as in news flash signs by trainer operating a typewriter whose keys set off electrical switch patterns.

"It is only a technological step," Prof. Krieg said, "to devise an appliance to scan the visual field in the same manner as a television scanner and to transmit that which is seen and recorded to the cortex (of the brain) in the same sequence and scanning pattern."

The fact that man sees and hears with his brain, not with his eyes and ears, is what makes such applications possible. Eyes

and ears merely receive and transmit stimuli. Use of electrodes to provide the stimulating signals will become possible, Prof. Krieg believes, as scientists learn more about the brain and nerve tracts and which ones to stimulate for sight, hearing and muscle movement.

Although much basic study will be needed before the theory can be put into practice, it "is not so much in the clouds as it sounds," Dr. Richard H. Young, dean of Northwestern's medical school, commented.

Future progress and research in neurology will be in this direction, he said, and achieving the goal of restoring sight, hearing and muscle movement is "perfectly possible."

Science News Letter, November 19, 1949

PSYCHOLOGY

Old Brain Drives the Intellect Via Feelings

► THE old brain, old in the sense that it came first in man's evolutionary development, deserves more credit than it usually gets, Dr. Stanley Cobb, Harvard University neurologist and psychiatrist, declared at the New York Academy of Medicine in New York.

This old brain is the part of the brain through which we feel and smell and it is much more than a relic left over from an earlier evolutionary stage for the lost art of living by smell.

"To the sorrow of many persons who believe they can rule their emotions by intellectual will power," Dr. Cobb said, this

earlier evolved brain, because it is the feeling brain, drives the intellect, motivates it and mobilizes the body to action.

But the hypothalamus, that walnut-sized part of the old brain which controls many vital functions, is not, Dr. Cobb said, "the seat of the emotions" as it has been called.

Among the functions under the influence of the hypothalamus are temperature control, water excretion, fat and sugar utilization, sleep and consciousness, blood pressure, and to some extent sexual function.

Science News Letter, November 19, 1949

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BOTANY-METEOROLOGY

Smog Injures Crops

Man-made pollution is costing thousands of dollars a year in damages to commercial vegetable and plant crops growing near industrial centers.

➤ AMERICA'S increasing smoke and fume nuisance probably causes hundreds of thousands of dollars damage each year to commercial vegetable and other plant crops grown in the vicinity of large cities.

Dr F W Went of the California Institute of Technology reported this fact to members of the National Air Pollution Symposium meeting in Pasadena, Calif.

Previously botanists had found that lichens disappeared from trees and rocks near industrial areas and that the growing of plants in large-city greenhouses is becoming more difficult.

But during the past five years, said Dr Went, a new type of plant injury had been observed in the smog-ridden Los Angeles area. This is a brown, dried spot injury, due to gaseous contaminants in the air. It has made such leafy commercial vegetables as spinach, endive and romaine unsalable.

"Since the damage is known to run into the thousands of dollars, and since no one single agency can be held accountable for the smog," said Dr Went, "it becomes very important to establish beyond any reasonable doubt that this injury to plants is really smog damage."

"This damage is of such frequent occurrence that profitable culture of certain vegetables becomes almost impossible in some areas. This injury always follows days of extra heavy smog."

In work now being carried out in the Earhart Plant Research Laboratory at the California Institute of Technology, with the support of the Los Angeles County Air Pollution Control District and the University of California, Dr Went and his associates are trying to determine which particular air-borne contaminants are responsible for the brown, dried spot injury.

The effects of concentrations of gases, known to occur in smog, are being tested on spinach, endive, romaine, beets, gladiolus, alfalfa, barley and tobacco.

"It can be assumed that most gases injurious to plants would be harmful to animals as well," Dr Went pointed out. "For these reasons an attack on the smog problem from the plant angle seems worth while."

Dr Went declared that man-made air pollution is at least partly caused by upsetting the natural cycle of assimilation and dissimulation by man.

"Instead of letting microorganisms decompose plant and animal remains," he said, "we burn them in a usually very ineffective way. Thus we not only produce air pollution, but also rob the soil of its

natural source of fertility humus."

What is the solution?

Dr Went believes that one of the most worthwhile contributions to smog abatement would be the organization of city-wide composting of refuse, hedge clippings, leaves and other combustible materials.

If this were well-organized, he thinks that collection and production costs could be paid out of the sale-value of the compost produced. This would improve soils which, in semi-arid and warm climates especially, are rapidly depleted of organic materials.

"Thus smog abatement and soil improvement become two aspects of the same problem which can go hand in hand toward amelioration of our environment—air and soil—using the processes which in nature have maintained an equilibrium for so many millions of years."

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PHYSIOLOGY

Design Apparatus To Study Body's Reaction To Cold

➤ A UNIQUE cold weather apparatus, which can measure the skin temperature and heat loss of 38 different areas of the body, is being used in sub-zero studies.

It is a hooded suit with built-in tubes and wires that connect with 38 body points. It works something like a telephone switchboard for you can dial any part of the body and receive its response recorded on a graph.

In addition, a chest panel on the suit is connected to another piece of apparatus which measures the heat production of the body.

Designed by University of Washington scientists, in Seattle, Wash., it was taken recently to Alaska to study the effects of Arctic temperatures on the human body. Dr Loren D Carlson heads the expedition. Other members of the party are Dr Allan Young and Wayne Quinton who were in charge of the design and construction of the apparatus, and Henry Burns who designed the suit.

They will act as their own guinea pigs, operating from a mobile laboratory which will enable them to make tests under varying temperatures ranging down to 40 degrees below zero. Since the Air Materiel Command of the U S Air Force is sponsoring the project, headquarters are at the Arctic Aeromedical Laboratory at Ladd Field, Fairbanks.

The study should reveal what physical characteristics make men best suited for



GAGING BODY TEMPERATURE

—This suit is wired to keep in touch with 38 different parts of the body and is being used to study the effect of Arctic temperatures on the body.

life in the Arctic and how the body can be made more resistant to extreme cold, Dr Carlson said.

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PLANT PATHOLOGY

Fungus Not Frost Causes Winterkill

➤ JACK Frost has been acquitted. For years farmers have held him guilty of winterkill, that annual round of cold-weather killings that takes such a heavy toll among the pasture grasses.

Long and patient detective work has finally revealed the true culprit, a cold-weather fungus with a string of aliases and a long record as a crop-spoiler. It goes by the names of crown rot, stem rot, and, when it moves in scientific circles, *Sclerotinia trifoliorum*.

Each year when the cool weather starts setting in, it has been noted that winter annual and perennial legumes, the pasture grasses like alfalfa, red clover, Ladino clover and others, are subject to an attack of what has been called up to now, winterkill. It was thought that frost and freezing caused it.

But plant pathologists at the U. S. Department of Agriculture's Regional Pasture Research Laboratory in State College, Pa., have now demonstrated that it is caused by this fungus, which lies dormant during the warm weather and stirs to its lethal activities as soon as the temperature starts to drop.

Science News Letter, November 19, 1949

AERONAUTICS

British Jets Spur U. S.

America and Russia used the British Whittle jet engine as basic model for their own development. This first engine has been given to America by the British.

► THE British "ancestor" of American jet engines, just presented to the American nation by the British Ambassador, Sir Oliver Franks, is the first engine of the type to power a British airplane in flight. It is the engine brought to the United States in 1941 and used here as a model in developing American jets. Russia later used Whittles as models.

This engine, known as the WIX, was the invention of a brilliant young Englishman named Frank Whittle, now Sir Frank Whittle. Jet-propulsion became his dream when a cadet in 1928. In 1936 he formed a company to build jets. Early engines were failures but success soon followed. With a special plane constructed for the purpose and a Whittle engine, flying tests made in the spring of 1941 proved a complete success.

When the WIX was brought to the United States, it was delivered to the General Electric Company at Lynn, Mass., by a small team of British engineers, together with complete drawings and technical data. It is another example of the complete collaboration between Britain and America in the scientific development of needed war aids, such as radar for example.

The idea of jet-propulsion was not new in America when this engine arrived. In 1923, the National Advisory Committee for Aeronautics published a report by Edgar Buckingham of the National Bureau of Standards relative to the future of jet propulsion. However, America's attention was directed toward better reciprocating engines, and better planes, until aroused by reports of German jet-propulsion activities.

A German jet-propelled plane actually flew in 1938, it was reported. However, it was not until 1942 that Hitler awoke to the possibilities of jet-propulsion in his war effort. Two years later, such planes were in production. The part they played in the war was minor, but they did spur both English and American development, although neither of these nations produced a jet-propelled plane that actually took part in combat.

To Britain belongs the credit for leadership in jet-propulsion of the type now employed. Which nation is actually in the lead today in the development of airplane gas turbines is debatable, although England claims the leadership and many Americans in a position to know agree with the British. It is certain that England had the first jet-propelled commercial airliner and probably leads in the use of the turbo-prop engine. This type of propulsion combines the efficiency of the gas turbine with con-

ventional bladed propellers. It is already in use in the United States and probably will be in very wide usage in transports in the near future.

American jet engines today are vastly

AERONAUTICS

Air-to-Air Rocket Bomb

See Front Cover

► A GUIDED missile for launching from an airplane against enemy aircraft, which has already passed successful tests in the air, was revealed by the Ryan Aeronautical Company, San Diego, Calif.

It is a 10-foot, winged, rocket-powered bomb with a warhead designed to explode when it is close enough to an enemy aircraft to insure destruction. If it misses its target, the warhead is automatically detonated in the air. Because of its small size and the speed obtained from its rocket power, it is a missile hard to track even on radar scopes.

The missile was developed for the U. S. Air Force and is said to be the first air-to-air type yet constructed. Air-to-air is a term used for a missile to be launched from one plane against another, both in the air. Its popular name is the Ryan Firebird, but in military terms it is the XAAM-A-1, which is short for experimental, air-to-air missile, Air Force, first model.

The Ryan Firebird is carried suspended under the wings of a jet fighter or bomber. When released, with its radar device homed on a target, it has the speed of its mother ship plus the added power of its own booster rocket and finally its flight rockets, as shown on this week's cover of the SCIENCE NEWS LETTER. It is capable of heading off and destroying its objective in a matter of seconds.

This air-to-air missile can be used effectively at night or in bad weather since visual sighting is not required. The missile's mother plane detects the enemy by radar. A complicated radar navigational and electronic system in the Firebird takes over when the missile is launched.

There is a similarity between the Ryan Firebird and the Navy Bat which was developed during the war. The Bat was shaped like a small plane, was airborne by a bomber, but had no propulsion power except that of its mother plane and gravity. It was an air-to-ground missile. Radar equipment in its nose, homed on a target

improved over the WIX that came from England in 1941. So are the British jets. Details of progress in Russia are not known outside the Iron Curtain, but the Soviets got a considerable number of Whittle jet engines from England under a wartime agreement. Russia's jets are perhaps based on the English Whittle, although Russia acquired at the close of the war some of the German jet engines and also took to the homeland some of the German scientists who had worked on the Nazi power plant. The Soviet jet engine of today may be a "hybrid" affair, with both English and German ancestry.

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located visually or by radar, was set by remote control in the carrier craft to head it directly for its objective. It did not use the wartime proximity fuse to cause explosion, but exploded on contact.

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VETERINARY MEDICINE

Artificial Insemination On Increase in U.S. Herds

► INCREASED practice of artificial insemination is boosting the cow population by about one per herd, the additional cow being supported by feed that formerly went to the bull.

Although they would not estimate the number of bulls that have been replaced in this way, dairy specialists of the U. S. Department of Agriculture said that at the beginning of the year nearly 2,000 bulls were in service in artificial-breeding associations.

Each of these sires served by means of artificial insemination an average of 1,250 cows each. This of course is many more than an individual stud bull would be able to serve by the natural method.

That the practice is on the increase is evident in some Bureau of Dairy Industry figures. The bureau estimates that by the end of 1949, 10% of all dairy cows in the country will have been bred artificially. In some states the figure is as high as 25%.

The advantages of the method include the following. An important saving in feed and investment which results from a herd's not having to keep its own bull. Increased safety on the dairy farm which does not run the hazards of an unpredictable bull. The most important advantage is that artificial insemination gives the widest possible spread to the usefulness of a high quality sire. Individual dairy farmers can breed their cows with the best, without having to own the bull themselves. This would be very expensive even if there were enough prime bulls to go around.

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CHEMISTRY-NUTRITION

Need Laws To Guard Food

Protection of foods by pre-testing chemicals added to them should be required by law just as drug testing is. Guesswork presents a health threat.

► **CHEMICALS** added to food, either to enhance its qualities or to protect it from plant pests, are a potential source of danger to our health. This warning was given by Dr. W. B. White, chief of the Division of Food, U. S. Food and Drug Administration in Washington, to the American Public Health Association meeting in New York.

We need laws to protect the safety of foods by pre-testing of chemicals added to them, just as the present laws cover the safety of new drugs before they are released on the market, Dr. White declared.

Many chemicals, he said, are pre-tested for wholesomeness but a few have only been guessed at. The result in one case was over 100 deaths and in another permanent leg paralysis in several hundred persons. The deaths were caused by the incautious adding of the poisonous chemical diethylene glycol to elixir of sulfanilamide by a young chemist who thought it would be an ideal solvent for the drug. The many paralysis patients were the victims of a poisonous chemical added to alcohol during prohibition days.

These kinds of accidents are forestalled now by the Food and Drug Act. But present food laws give inadequate protection. Arsenic, or nitrogen trichloride, was used for 25 years for treating flour, and discontinued only last year after it was discovered it gives fits to dogs. There may be other potentially dangerous chemicals in our foods but there is no way of avoiding them under present laws.

Dr. White cautions that the "situation calls for genuine concern about the future, but not for alarm or hysteria about the present."

Two resolutions have been recently introduced before Congress to make a study of the situation.

Hearings have been set by the Federal Security Administrator for Jan. 17, 1950, on tolerances of chemical sprays on fresh fruits and vegetables. This is intended to be a pooling of information on insecticidal poisons and their near relatives which are used to spray crops to preserve them.

"Wishful guessing" has also marked the use of DDT in the past. At one time it was claimed that because there were no apparent ill effects in the use of DDT to delouse combat troops during the war it was harmless. Since then it has been proven that DDT has harmful effects in experiments with rats. Cows were shown to secrete DDT in their milk when sprayed with it to kill flies. This situation was corrected

but less is known about other insecticides which may be a chronic threat to the nation's health.

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CHEMISTRY-AGRICULTURE

Corn's Ripeness Found By Chemical Reaction

► **HEADLIGHTS** on bicycles or automobiles of many years ago were lighted by the same chemical reaction through which the maturity of sweet corn can now be determined.

Acetylene headlamps on bikes and automobiles used the reaction of water on calcium carbide to produce a gas that would burn to give light.

The amount of moisture in ripened sweet corn is dependent upon its maturity. In the method disclosed by the Western Regional Research Laboratory of the Department of Agriculture, Albany, Calif., a sample of ripening corn is ground very fine and calcium carbide added. The amount of acetylene gas given off by the action of the moisture in the corn is measured, and from this the maturity determined for that variety of corn, locality and season.

Canners need to be able to check the

maturity of corn to gather it at just the right stage to insure a desirable and uniform finished product. Previous testing methods have been costly or time consuming.

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AERONAUTICS

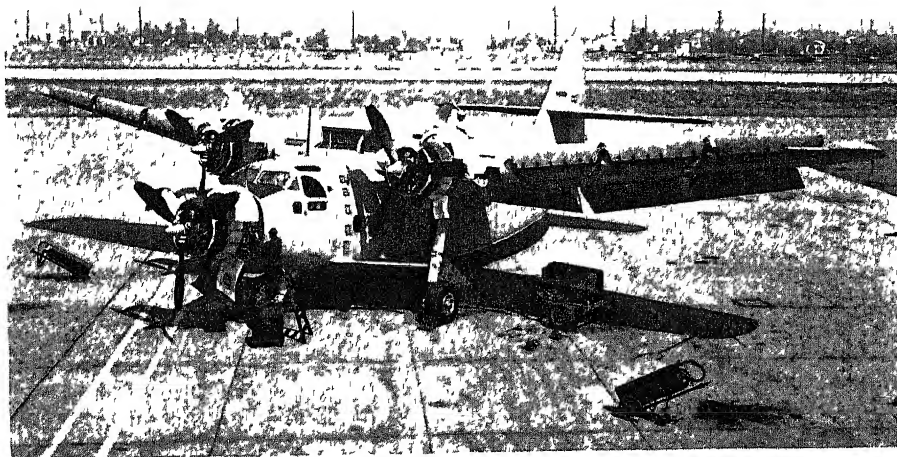
New Plane Has Parts Easily Accessible for Repair

► A **LOW-DOWN** engine in the nose and two high-up engines in the wings are striking features of a new Air Force assault transport now completed and undergoing tests in Hawthorne, Calif., by the manufacturer, the Northrop Aircraft, Inc. However, the important feature of this plane, a raider to be known as C-125, is the ease with which all parts can be reached for repair in advanced positions with a minimum of repair equipment.

The nose engine is accessible from a six-foot stepladder. Steps recessed into one side of the fuselage permit access to the top of the wing. A portion of the front wing edge under the wing engines can be opened to form a working platform for engine maintenance. Truck-like fasteners, requiring no special tools, enable mechanics to get at the engines with ease. Wing leading edges can similarly be "unbuttoned" for inspection of control, hydraulic and electric systems.

This plane, with its high wings, has sturdy, fixed landing gear able to take the shock of high-weight landings on rough terrain. Wheels can be changed in an emergency without use of a jack. The craft can be used to transport heavy cargo or to accommodate 32 men with their equipment.

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ASSAULT TRANSPORT—The Northrop Raider C-125 has been designed to make all parts of the plane easily accessible for repairs.

MEDICINE

Aureomycin Is Promising In Syphilis Treatment

➤ AUREOMYCIN is showing some success in the treatment of early syphilis in trial tests reported by Drs Jack Rodriguez, Frederick Plotke, and Seymour Weinstein of the Chicago Intensive Treatment Center and Dr. William W Harris of the U S Public Health Service in Chicago

About 39 hours on the average after the antibiotic is taken in pill form syphilis sores are rid of the spirochetes, the germs causing the disease, the physicians report in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Nov 12)

Twenty-seven patients received this treatment but the effect was studied in only 16. These showed that open syphilis sores healed completely in every case but it took longer to do the job than when using arsenical compounds or penicillin, the physicians found

Also, each patient had to be given a multi-vitamin capsule daily during treatment because aureomycin kills the bacteria of the intestinal tract needed for the synthesis and absorption of essential nourishing substances

Other undesirable effects from the antibiotic were fever and nausea which was often accompanied by vomiting. The physicians pointed out that because of the high dosage of the antibiotic necessary for treatment there was a mild or moderate degree of stomach upset in almost all of the patients. They countered some of this type of reaction by giving aluminum hydroxide gel before each dose of aureomycin

The antibiotic is given every four hours for about two weeks. It has definite anti-syphilitic effect but they caution that it is too early to say more

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CHEMISTRY

Better Fruit Flavors Ahead with Repeal of Tax

➤ THE public will now get a chance to taste government-developed fresh fruit flavors, with the removal of prohibitive taxing under alcohol laws that kept them out of quantity production

The apple and grape flavors are produced by a process of rapid vaporization of the fresh fruit juices in special equipment developed for the purpose at the Department of Agriculture's Eastern Regional Research Laboratory in Philadelphia

Portable equipment which can extract essence right in the orchard has also been developed. The volatile vapors are then condensed into a natural-flavor fruit essence which can be used in candy and food flavoring

The method is an improvement over previous steam distillation processes because it captures the highly volatile elements which make up the natural flavor of the

fruit. These elements are mainly forms of alcohol. Until last September an alcohol tax of \$9 per gallon was levied on the fruit essence

It was this tax which discouraged the wide commercial use of the new method, even though it has been available since 1944 when the process was first announced

Interested companies pointed out that the essence is very sirupy and sweet and quite unsuitable for beverage use. As a result Congress directed revision of the Internal Revenue Code exempting fruit concentrates from the tax. However, if the concentrate is to be transported, it must be denatured with acetic acid. When the concentrate is made and used in the same plant, denaturing is unnecessary

The Department of Agriculture believes that between 16 and 30 companies are set up to make fruit essence by the new method

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AGRICULTURE

World Milk Production Now 90% of Prewar Peak

➤ DESPITE a slight sag in American production, world milk production in 1948 rose to about 90% of the prewar output, the U N Food and Agriculture Organization in Washington reports

The United States, the world's largest milk-producing country, fell behind her 1947 total by 3%. The number of cows was lower than at any time since 1930, but yield per cow was higher

Although worldwide data are scarce for some important regions, the FAO finds that increases in Europe, resulting from the improved feed situation, seem to have been matched by rises in South America and Africa. In India, where much of the milk comes from buffaloes, figures are very scanty, but from estimates the FAO ranks India as the third largest producing area, after the United States and Europe

Further details appear in a recently published FAO commodity study

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CHEMISTRY

All-Synthetic Fiber Will Compete with Other Yarns

➤ COMPETING next year with such familiar fibers as silk, wool, cotton and nylon, for shirts, curtains, men's suits and blankets will be an all-synthetic fiber, dynel, announced by Carbide and Carbon Chemicals Corporation, New York.

A short staple form of the 12-year-old synthetic fiber vinyon, it can be easily handled on spinning and weaving mills now using the conventional fibers. It is claimed that fabrics made of this acrylonitrile-vinyl chloride fiber will not burn, are not attacked by moths, will dry quickly and stand up well under exposure tests

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ENGINEERING

New Non-Brittle Cast Iron Can Be Bent or Twisted

➤ NOW protected by patents just issued, details of a new cast iron that can be bent or twisted were presented to the Gray Iron Founders' Society in Chicago by Don Reese, International Nickel, Bayonne, N J. Because it is not brittle like ordinary cast iron, the new product will have many applications

This new ductile cast iron combines processing advantages of cast iron, such as fluidity, castability and machinability, with many of the product advantages of steel, he stated. The essential feature of the invention is the introduction into and retention by the molten iron under treatment of a small but effective amount of magnesium

The presence of the magnesium produces a new graphite structure which is in the form of spheroids or compacted particles. Due to the elimination of a substantial amount of the usual weakening flake graphite, the new product possesses high tensile strength, elasticity, toughness and ductility

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ENGINEERING

New Electronic Torch Can Melt Tungsten

➤ HEAT hot enough to melt tungsten, which melts at 3,370 degrees Centigrade and has the highest melting point of all the metals, is obtained with a new "electronic torch" revealed by the General Electric Research Laboratory. It utilizes extremely high-frequency radio waves with such gases as nitrogen or carbon dioxide fed past the discharge arc

As described by Dr J D Cobine, GE scientist, the heart of the torch is a tube known as a magnetron which produces radio waves of 1,000,000,000 cycles per second. Leading from the tube is an antenna made of two short metal cylinders, one within the other. A high-frequency arc can be made to form on the end of the antenna. If certain gases are fed past the arc, the electronic torch results. It resembles a jet of flame about nine inches long

The high temperatures produced on any surface placed in the jet are caused almost entirely by the heat generated by atoms joining together to form molecules, according to Dr Cobine. The molecules of certain gases are broken up into atoms by the high-frequency arc. These atoms join together again on surfaces placed in the torch. The jet itself is not necessarily hot

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E FIELDS

NUCLEAR PHYSICS-METEOROLOGY

Atomic Energy Plants Will Send Poisons into Air

➤ THE development of atomic energy for peacetime industrial uses will make "stack meteorology" an important science of the future

Norman R. Beers, editor of *NUCLEONICS MAGAZINE*, at the National Air Symposium, Pasadena, Calif., predicted that large atomic energy plants will put in the air materials that are either unusually toxic for chemical reasons or measurably radioactive

Mr. Beers defined "stack meteorology" as "the entire problem of air pollution from stacks of chimneys as the meteorologist sees it"

The fogging of photographic plates occurred a thousand miles from the first atomic bomb explosion in New Mexico, Mr. Beers recalled. Dust from the great Krakatoa volcano has traveled around the world. Industrial smoke and fumes are likewise carried greater distances than is generally realized

"Aviators have seen smoke from large cities adequate to dirty their windshields and to decrease visibility up to 300 miles away from the smoke source," he said

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NUCLEAR PHYSICS

Beryllium Keeps Form Up to 1,800 Degrees

➤ BERYLLIUM, the light metallic element that can be used as a moderator and reflector of neutrons in an atomic energy pile, does not change even when subjected to temperatures as high as 1,800 degrees Fahrenheit

Contrary to several reports published in scientific journals, Paul Gordon of the Illinois Institute of Technology, Chicago, reported that the same form of beryllium that exists at room temperature is found at much higher temperatures

Using a specially designed high temperature precision X-ray camera, Mr. Gordon examined very thin disks of beryllium to obtain the results he reports in the *JOURNAL OF APPLIED PHYSICS* (Oct)

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ENGINEERING

Extra Light Auto Oil Best For Sub-Zero Climates

➤ AN extra light crankcase oil for the automobile, designated as 5-W by the oilmen, is satisfactory to use in areas of sub-zero winter weather, the Society of Automotive Engineers was told in St. Louis, by V. G.

Raviolo, Ford Motor Company, Dearborn, Mich. He presented a committee report giving the results of a special study

This oil, he said, is regarded as a substantial improvement over the winter lubricant now made by diluting 10-W oil with kerosene. Starting with it is about one-third easier, and there is little or no observable increase in wear except under extreme heavy-duty operating conditions. There is a gain in oil consumption of approximately 30%, but compensating benefits are found in the ease of starting and in the stability of the oil

The conclusions reached by the committee are based on extensive tests in which 26 trucks and 197 passenger cars were used. Eleven automobile and 23 oil companies participated. The report points out that the ability of 5-W oil to maintain its viscosity and stability under operating conditions contributes to its superiority over lubricants made by diluting heavy oil

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MEDICINE

Smallpox-Like Skin Ill Checked by Aureomycin

➤ AUREOMYCIN is showing promise in saving the lives of children with a virus-caused skin disease, and may turn out to be a remedy for smallpox, Dr. Frederick G. Perry of the Duemling Clinic and Dr. P. C. Martineau of the Lutheran Hospital, Fort Wayne, Ind., reported

They cited the case of a two-year old boy who had eczema since the age of three weeks. After playing with a little girl who had been vaccinated for smallpox he became acutely ill, his temperature rising to 104.8 degrees Fahrenheit. His eyes were swollen shut and blisters formed over his entire body. Examination revealed the smallpox virus was responsible, the physicians declared in the *JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION* (Nov 5)

The disease is called eczema vaccinatum and usually affects infants and children under five years of age. About a third of those who get the disease die from it.

Boric acid compresses applied locally and penicillin injections failed to help the little boy. So aureomycin was tried the second day he was in the hospital with improvement showing within 24 hours. The blisters began disappearing, others dried up, and his temperature returned to normal. He was apparently well on the 11th hospital day and was discharged. The physicians said that at this time most of the crusts had vanished and there was little scarring

Although they don't know whether aureomycin checked the secondary infection or had an antibiotic effect on the virus causing the disease, they feel the drug may be of special value in treating cases of eczema vaccinatum and possibly smallpox

Science News Letter, November 19, 1949

MEDICINE

Army Hospital Staffed With Women for War Study

➤ A REHEARSAL for war is taking place at the Murphy General Hospital in Waltham, Mass., where the Army is replacing male personnel with female non-professional help

The experiment which began in June is expected to run for 18 months. Maj. Gen. George E. Armstrong, deputy surgeon general of the U. S. Army, told the Association of Military Surgeons meeting in Washington

Murphy is the only hospital participating in the experiment and at its conclusion will return to normal. But at present all female Army personnel who are qualified are replacing medical technicians, administrative officers, cooking specialists and other personnel. WACs are replacing hospital corpsmen

There is also legislation before Congress for a study to enable female doctors and dentists to be commissioned which has not yet been approved

The study is to provide a measuring stick which will show whether female personnel can take over as many duties as possible in hospitals located in the interior. It will not be applied during peace time

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INVENTION

"Aging" of Liquor in Bottle Now Possible

➤ A BUNDLE of sticks inside the whiskey bottle continues the "aging" of liquor, it is claimed in a patent just issued. One advantage is that the whiskey will not have to be kept in kegs for aging for so long a period. It can be bottled and shipped to dealers on whose shelves it will acquire additional smoothness and better taste

The patent, 2,487,594, was issued to Harold A. Rudnick of Boston. The process can be used with other alcoholic liquors as well as whiskey. It can be used with liquors stored in a jug, or in any container the walls of which are chemically inert to the alcoholic beverages

The sticks may be of any shape, but elongated rods are preferred. For whiskey, oak sticks are recommended, which may or may not be charred. The bundle, after insertion in the bottle, is allowed to spread so that the surfaces are in better contact with the liquid. The sticks should be plentiful enough to have sufficient surface area to permit aging to continue at a reasonably rapid rate

Most aging of liquor is done in oak or other wood containers. Part of the contents is absorbed by the wood, evaporates and is lost. Such loss is prevented when the aging is done in the bottle. This is another advantage claimed in the patent.

Science News Letter, November 19, 1949

AGRICULTURE

Science Preparing the Feast

Thanksgiving menus this year will profit from the work of plant and poultry scientists who have given us small turkeys and improved sweet potatoes.

By MORTON STARK

➤ YOUR ideal Thanksgiving feast is being prepared now, not by chefs but by scientists at plant and poultry experiment stations.

Some of the scientists' handiwork, like the Beltsville Small White turkey and well-fleshed sweet potatoes, are already available. Others, like bigger cranberries and home-grown chestnuts, are still on the way.

The small turkey, product of years of breeding experiments, was tailored to the needs—and kitchenettes—of the small-size family of today. The market bird averages around 11½ pounds, has a compact body carrying a high percentage of edible meat.

Compact Turkey

The desired compactness, intended for small ovens as well as small families, comes from the fact that the Beltsville turkey does not have the gap that turkeys usually have between the rear of the breast bone and the legs.

The sweet potato that you will find when you go marketing is another product of the plant breeders' skill. Although the varieties on sale don't show the striking modifications of the diminutive turkey, they are improved types.

Improved Sweet Potato

One of the more common, called Orli (a contraction of orange-little-stem), has been bred as a successor to older less satisfactory sweet potatoes. It is high in caroten content, a vitamin A element. This and other kinds which have been developed by the plant breeder assure the housewife that the potatoes she buys will not be stringy and that the flesh will be firm, moist and of an appetizing color.

Your succulent turkey with its attendant yams will no doubt be garnished in the traditional manner with cranberry sauce and chestnut stuffing. If these fall short of the plant breeders' highest expectation for them, it will not be for lack of trying.

It is a long uphill road from the drawing board to the festive board. Take chestnuts, for example.

Back around 1915 Department of Agriculture scientists started to introduce foreign chestnut trees into this country. Their object at the time was not better nuts, but better trees for timber. Our own trees produced an abundance of excellent chestnuts, which duly found their way on Thanksgiving Day into the very center of the center of interest. Into the turkey, that is.

Unfortunately, the introduced chestnut

trees, mostly from the Orient, brought with them the chestnut blight. American trees were fatally susceptible to the blight, and have been all but wiped out. The market chestnut is an import from Italy or Spain.

New Chestnut Types

In the intervening 40 years since the Oriental trees were first brought in, government scientists have been at work trying to develop a new chestnut to replace the native type. Only a few weeks ago, they announced that they have succeeded. Now that the three new types, with large, sweet nuts, are going out to tree nurseries, it can be predicted that within a span of years American-grown chestnuts may once more be available for their traditional task of stuffing the traditional bird.

Cranberries are another matter. Good domestic cranberries are to be had, and no apologies need be made for them. They too, like the sweet potatoes, have benefited by years of selective breeding for the most desirable characteristics. But the extra big berry with which Agriculture Department small-fruit breeders have been hoping to

tickle the American palate this year is not yet ready.

It looked for a while as though it might be available in time. The type berry has already been developed, but all the experimental work that goes into the launching of a new variety has not yet been completed. After certain trials and crosses now under way have been tallied, it is hoped that this large-size, high-gloss, high-yield berry may be ready to announce in the spring.

There are many things that Americans have to be thankful for this Thanksgiving. It might not be amiss, after the more reverential solemnities, to make a small secular bow in the direction of the scientists who are constantly at work improving the menu's classic ingredients.

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GEOLOGY

Crossing Nile by Dry Land Bridge Impossible Now

➤ NOT Biblical like crossing the Red Sea, but it is a fact that crossing the Nile on dry "land" was possible up until a few years ago. But the bridge, which was a mass of floating vegetation, was washed away in the floods of 1946.

About a year ago there were reports that



NEW CHESTNUT VARIETY—America's bid to replace her vanished native chestnut, new blight-resistant strains, will not be available in quantity to stuff many birds this year.



SMALLER TURKEY—S. J. Marsden, in charge of the Department of Agriculture research that developed the Beltsville Small White Turkey, holds one of the compact 11½ pounders.

another bridge was beginning to form, with grass, trees and other vegetation being brought down the river and held by a large rock in mid-stream which acted as a foundation. But the very heavy floods of last October washed it away. This year there was a search along the banks of the Nile, from Nimule to Juba, without finding a sign of a dry crossing.

Elephants were able to cross the bridges that were successively in existence for eight and 10 years. They were located where the river is 80 yards across and the bridges were about 250 yards wide.

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CHEMISTRY

Fluorine Plastic for Industrial Use Developed

➤ A FLUORINE plastic in a form that will stick to many metals, to glass and to porcelain for industrial use was announced. Fluorine is a very reactive chemical that has only recently been tamed.

Known for its outstanding resistance to heat and chemical attack, the plastic, tetrafluoroethylene, has previously been difficult to fabricate because of these very properties.

Chemists at Du Pont Company, Wilmington, Del., have increased the possible uses of the compound, trade-marked Teflon, by reducing the size of the plastic bits until they are so small that they remain suspended in a carrying liquid, somewhat the way butter fat is suspended in fresh milk.

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VETERINARY MEDICINE

New Foot-Mouth Virus

This new type of virus, foreign to Mexico where it was found, is disturbing since its source is unknown and present vaccine is not effective against it.

➤ THE unexplained appearance in Mexico of a foot-and-mouth disease virus of a type hitherto unknown there is a matter of grave concern, but U. S. government officials do not think it will turn into a runaway plague like the original outbreak in December 1946.

The single known site of the new virus Type "O", a ranch near Mexico City, has already been cleaned out. And all the experience and equipment gathered in three years of fighting the disease is in readiness, should it reappear.

This high state of preparedness permits a certain amount of optimism, but members of the Joint Mexican-United States Commission for the Eradication of Foot-and-Mouth Disease are deeply concerned over the outbreak. So are Department of Agriculture officials in Washington, one of whom labelled it "extremely serious."

They are concerned because of mystification over the source of the new virus. The original infection was caused by virus Type "A". The vaccine now in use is only effective against Type "A". The new virus is Type "O", known in Europe and South America but hitherto undetected in Mexico.

There are two possible sources of Type "O". It might have been brought in from outside the country. The authorities have been vigilant in their efforts to guard against importation, but it still might have slipped in despite these precautions.

The other source is by natural mutation of a Type "O" strain of virus from the original Type "A". This theory has never been proven, and scientists are not certain the new type could arise in this way.

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BIOLOGY-BOTANY

Test Tube Tomatoes Grown

➤ RED tomatoes, as tasty as vine-ripened ones, have been grown on synthetic food from a flower detached from the plant.

This is the first time that fleshy fruits have been grown by a test tube process though such growth of isolated roots, stems and seed embryos has become classical.

The test tube tomatoes were grown by Dr. J. P. Nitsch of the Kerckhoff Laboratories of Biology at California Institute of Technology, Pasadena, Calif.

The tomatoes "tasted like usual tomatoes," he reports in the journal, *SCIENCE* (Nov. 11). They were seedless and small. Each was about one inch in diameter. But each flower had only about an ounce of food supply at its disposal. The lack of seeds, Dr. Nitsch says, may have been due to the lack of pollination, because the plants were raised in a greenhouse where pollination was very poor, or to killing of the pollen tubes by the sterilizing chemicals.

The tomato flowers that yielded the test tube tomatoes were of the San Jose variety. They were cut from the plant, sterilized with calcium hypochlorite, and planted in glass flasks containing various chemicals. No growth occurred in a medium containing only mineral salts, sugar, vitamin B one and the amino acid, cysteine. The addition of sterile juice from either green or red tomatoes caused the ovaries to develop.

A week after planting in the glass flasks, the ovaries became visible, pushing up the

petals and stamens which had kept them hidden. They then enlarged regularly until about the 25th day after full bloom, when growth slowed down.

About the 35th day, fruits turned red and ripened at the same time as tomatoes left on the plant.

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AERONAUTICS

Droppable Fuel Tanks Give B-50 Bombers Longer Range

➤ DROPPABLE external fuel tanks, one under each wing, give a new version of the Boeing B-50 Superfortress a longer range, it was revealed in Seattle, Wash., by Boeing officials. The two tank fittings when not wanted to carry fuel can be used to carry a 4,000-pound bomb.

The best known of the B-50s is "Lucky Lady II" which circled the earth relatively recently in a non-stop flight, being refueled in the air several times on the trip. The new bomber, known as B-50D, is now being delivered to the U. S. Air Force.

Other improvements in addition to the detachable fuel tanks are included in the advanced version. They are new radar equipment, a new molded plexiglass nose section, a modified four-gun turret, and a new refueling system by which the plane is fed with fuel from a single intake.

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MEDICINE

Radar Enters Cancer Fight

► LIVES, money and many worry-ridden days may be saved by application of an Army-invented radar development to cancer fighting, announced by the National Cancer Institute

The development consists of the instantaneous processing of radar photographs. It is now going to be used for processing photofluorographic films used to detect stomach cancer in its early, potentially curable stage. The U S Public Health Service, on recommendation of the National Cancer Advisory Council, is granting \$49,626 to Dr Russell H Morgan, professor of radiology at Johns Hopkins University, Baltimore, for this work toward the control of cancer.

Controlling stomach cancer has been one of the toughest jobs cancer fighters have had. This form of cancer kills 60% of its 100,000 victims each year. The start of the disease is so insidious that there is no warning signal to attract either the patient's or his doctor's attention before the malignant growth has advanced beyond the curable stage.

In the hope of making mass X-ray detection studies possible for stomach cancer, Dr Morgan has developed and tested a spe-

cial camera, the Schmidt fluorographic camera. The unique optical system of this camera enables it to take sharp pictures of the relatively dim image appearing on a fluoroscopic screen. Its efficiency is said to be 10 times that of any photofluorographic unit previously available. The photofluorographs define the internal organs clearly enough to show tumors or other abnormalities without exposing the patient or X-ray operator to a dangerous amount of radiation.

By using the Army's method for rapid processing of radar photographs in combat operations, the photofluorographs for cancer detection can be made without need for darkroom equipment and film storage files. This will cut costs.

In addition, a report of any signs of disease can be had immediately, so that any necessary further check-up or examination can be made while the patient is still at the clinic. This may save lives by cutting down the period between detection of the cancer, if there is one, and operation for its removal. And it will save the person examined from days or weeks of worry while waiting to hear the results of the examination.

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through the same cycle as the guinea pig's, so the studies give an indication of when the change that readies the brain for thinking takes place.

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ACOUSTICS

Very High Sound Waves Kill a Rat but Not a Man

► RATS and guinea pigs can be killed with high frequency sound waves, but man is safe against them because he has no fur, the National Safety Congress was told in Chicago by Dr Horace O Parrack of the U S Air Force Medical Laboratory.

With the fur-bearing animals the sound energy is turned into heat. They die from high-frequency noise because they get so hot the body proteins coagulate. When the hair is shaved off, sound does not bother the animals much more than it does man. Man, with his much more efficient skin ventilating system, is safe at energy levels 120 times greater than the animals ordinarily are, he said.

Studies being made by Dr. Parrack are concerned with the effect on airmen of jet propulsion and other modern aircraft engines. His investigations do not show that the sound field generated by current aircraft power plants is not hazardous. Jet engine noise fields constitute a serious hazard to hearing organs in that temporary deafness will follow even brief exposures and repeated exposure may result in permanent deafness.

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MEDICINE

Pre-Birth Brain Activity

► IF MAN'S development follows the pattern of lower animals, he begins to think, or his brain is at least ready to start thinking, three months before birth.

That this might be true is indicated in researches reported by Dr. Louis B Flexner at the meeting of the American Philosophical Society in Philadelphia. Dr Flexner is on the staff of the Carnegie Institution of Washington's embryology department in Baltimore.

Dr Flexner studied the nerve cells of the gray matter of the brains of guinea pigs at various stages in their pre-birth development. About two-thirds of the way

through the pre-birth period, a series of "abrupt changes" occurred in the nerve cells.

Nerve processes started to grow rapidly. The volume of the nucleus of each cell stopped increasing. An enzyme believed to have a useful energy-yielding activity increased sharply to the adult level of activity. Other enzymes, responsible in part for the combustion of foodstuffs, increased rapidly to the adult level.

At the same period the nerve cells for the first time are electrically active. Electrical potential changes, known to the layman as brain waves, can be recorded from the surface of the brain at this same two-thirds stage of the guinea pig's pre-birth development.

The nerve cells of the guinea pig's cerebral cortex, or brain gray matter, "begin to show functional activity about two-thirds of the way through gestation," Dr Flexner concludes.

Whether this means that man's brain is ready to start thinking three months before birth cannot be stated definitely for two reasons, he explained. One is that we "don't know what cells we think with." The other is that guinea pigs are born more nearly grown-up than human babies. But man's pre-birth development probably goes

ASTRONOMY

Plan for Re-Equipment Of India's Observatories

► TWO Indian astronomical observatories will have the most modern equipment when plans discussed by Pandit Jawaharlal Nehru during his visit to Harvard College Observatory, Cambridge, Mass., come to fruition.

The Indian Prime Minister and his sister, Ambassador to the United States, spent part of their Boston visit conferring with President James B. Conant of Harvard and Dr Harlow Shapley, Harvard astronomer, about a new Schmidt-type telescope for the Allahabad University observatory in north India and a sun-observing coronagraph for famous Mt Kodaikanal solar observatory in southern India.

This re-equipping of the Indian observatories will give that country the best telescope in Asia and a solar instrument equal to those in America and France. Dr A C Banerji of Allahabad is being sent to America by the Prime Minister to get the project underway and later Dr A K Das will come to work out the solar project. The beginning of the cooperation was Dr Shapley's visit to India last year.

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The chasm between the intelligent layman and the marvelously growing science of Mathematics is being bridged by the Mathematics Magazine. About 40% of the magazine is devoted to easy reading, 25% to papers requiring some college Mathematics and 30% to advanced topics (mostly expository). For example, a series of "Understandable Chapters on Various Courses in Mathematics," beginning with first algebra, is now running. Vol 23 No 1, Sept.-Oct. contains such a chapter on Elementary Number Theory by Prof E T Bell of the Calif Institute of Technology.

The Mathematics Magazine is published bi-monthly except July-Aug. Subscription price is \$3.00, single copies 65c.

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MEDICINE

Insert Plastic Thigh Bone

Diseased natural bone in the thigh of a boy was replaced by a polyethylene plastic to which the tendons and muscles were attached.

➤ A SUBSTITUTE thigh bone, carved from a block of polyethylene plastic, has been successfully substituted in the leg of a 12-year-old boy for the natural bone which had to be removed because of disease.

The "formidable" two-hour-long operation in which the boy's own bone was "filleted" out of his leg and the plastic substitute attached to muscles, was performed by Dr. H. J. Seddon, of the Royal National Orthopedic Hospital in London, assisted by John T. Scales, of the Institute of Orthopedics, also of this city.

The boy had for a long time suffered from the abnormal bone condition called chondromatous dysplasia. The inner, longer leg bone below the knee as well as the thigh bone was affected. The surgeons had agreed that amputation through the hip joint was the only satisfactory treatment.

"But an artificial limb for such an amputation is at best a poor affair," they state in their technical report in the LANCET (Oct. 29), "and we welcomed the suggestion made by Mr. K. I. Nissen that an attempt should be made to amputate the limb through the middle third of the thigh, fillet out the femur (thigh bone), and substitute for it a plastic model of its upper half or two-thirds."

The polyethylene plastic was chosen because of its stability and high resistance to chemical change, its considerable toughness and resistance to fatigue strain and its non-wettable surface which living tissue does

not stick to. Its safety for use in the body had already been learned through animal experiments.

Precise measurements of the normal thigh bone were first made with very carefully taken X-ray pictures. The plastic substitute was carved to these measurements. When finished it weighed seven and one-half ounces and was eight inches long. Channels were made in it so that tendons from hip and other muscles could be slipped through, to attach the substitute thigh bone to muscles. This gave some chance of its being well controlled by the more important muscle-groups. A good fit of the head of the thigh bone to the hip was obtained by filing its surface after a preliminary fitting during the operation.

The boy's own thigh bone was dissected out by peeling off the muscles by diathermy cutting, or an electric knife as it is sometimes called. The muscles not attached to the plastic substitute bone were stitched together.

Two pints of blood were given during the operation and another pint after it. Penicillin and later streptomycin were given to control infection which was feared because of the "enormous" area of tissue exposed during the operation.

Less than two months after the operation, the stump had become normal, the boy had been fitted for an artificial leg and was walking on a temporary "pylon."

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promptly relieved by ACTH and the cancer decreased by 90% in size, but microscopic examination of a tiny bit of the tumor tissue showed that cancer cells were still present.

Another was a woman with severe skin trouble, sore mouth, loose teeth associated with glandular disturbance. ACTH helped her, too, but her symptoms gradually returned after the treatment was stopped. This was also true of the other two patients who had rheumatoid arthritis.

The five patients had such different conditions, affecting such different cells of the body, that the results suggest ACTH "works through a fundamental biochemical system of the body to affect the metabolism of all the cells," the scientists conclude.

ACTH is a hormone from the pituitary gland which acts to stimulate the adrenal gland, producer of cortisone, which has brought relief to rheumatoid arthritis patients. Both chemicals are so scarce that only tiny amounts are available for medical research.

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Words in Science—

KALEIDOSCOPE-STEREOSCOPE

➤ TWO instruments which used to be very popular for amusement in our grandparents' parlors were the kaleidoscope and the stereoscope. Both are viewing instruments.

The kaleidoscope—you say it ku-lye-doe-scope with the stress on lye—makes use of mirrors to make tiny bits of colored glass appear as beautiful symmetrical designs which are forever changing as you turn the instrument.

The stereoscope—pronounced ster-ri-oh-scope with the accent on ster—is an optical instrument which blends two views of the same scene, taken from slightly different positions, so that they appear as one three-dimensional view. With the stereoscope Grandmother used to enjoy life-like views of Niagara Falls.

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MEDICINE

Hormone Aids Mental Ill

➤ THE 50-year-old woman was despondent and wanted to kill herself. She thought people were plotting against her, casting "spells" over her, poisoning her food, filling her room with poisonous fumes. She felt nervous and very weak.

At the hospital they gave her a dose every six hours of ACTH, hormone chemical which has gained fame for relief of rheumatoid arthritis sufferers. After four days the doctors stopped the ACTH because there was no more available. But the woman was strikingly improved. She smiled and said she felt better. Her delusions of people plotting against her still persisted.

A week after she left the hospital these delusions abruptly stopped. She went back to work as a domestic servant for her former employer who said "she is like her old self again."

Whether the ACTH brought her out of the depression and mentally sick state or whether her recovery just happened at the same time is not known. So far, two months after treatment, she has not had any further symptoms of her sickness.

Her case is reported by Drs. Tom D. Spies, Robert E. Stone, Samuel Dreizen and Benjamin F. Morton of Northwestern University Medical School, Chicago, and the Nutrition Clinic of Hillman Hospital, Birmingham, Ala., in the SOUTHERN MEDICAL JOURNAL (Nov.).

Her case is not reported as a cure. She was chosen along with four other patients for short-term treatment with the scarce ACTH in studies planned to see what the hormone chemical might do in disorders of the aging process.

One of the patients was a 60-year-old man with cancer of the lip. Sensitiveness was

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Bird of Opulence

➤ THERE is a movement among turkey raisers to develop a small bird more commensurate with the capacities of today's small families. The idea is to reduce the bird to the proportions of a more workaday menu, to remove roast turkey from the category of exclusively feast-day fare.

One bows to inevitable progress, but not without a sense of loss. The whole spirit of the traditional Thanksgiving turkey lies in its amplitude, its largesse. Turkey is more than an outsize chicken. When our forefathers cast about for the piece de resistance of the first Thanksgiving, there were no rival candidates.

Turkey was elected unanimously not alone because he was so abundant but also because his fleshly endowments perfectly suited him for the role. Not only was he palatable, he was big. A gentleman named William Wood, writing in Massachusetts about 1630, observed that "These Turkeys remaine all the yeare long, the price of a good Turkie cock is foure shillings; and he

is well worth it, for he may be in weight forty pound."

The turkey was unknown in the Old World. It was found by the explorers and colonists all the way from Central America to southern Maine. Flocks of the birds roved the forests in great numbers, being especially numerous in New England.

The feeding habits of the wild turkey were extremely adaptable, and this in large measure was his undoing. Hunters would lie in wait around cornfields and when the birds settled to feed would slaughter them in quantity. A common expedient was to lay out long lines of corn along the length of a ditch and then pour a fusillade into the flock of sitting birds.

By such indiscriminate killing, the wild turkey was wiped out in all but a few localities, notably the less inhabited areas of the Gulf States. The last recorded shooting of a wild turkey in Massachusetts was a year or two before the Civil War. This took place on a mountain fittingly called Mt. Tom. Today's table turkey is a domesticated bird, raised on a turkey farm.

The white man was by no means the first to appreciate the prime gustatory qualities of Tom Turkey. The Indians of

Mexico had already brought the bird under domestication when the Spaniards came. Cortez found them in the markets of Mexico. And it is through him, by a devious route, that the turkey gets its misleading name.

The Spaniards brought turkeys back to Europe with them. From Spain they were carried to the Near East, whence they were introduced into northern Europe. Like several other native American products, among them tobacco and corn, turkey was thought to have originated in Turkey, or even farther east, in India.

Benjamin Franklin wished to make turkey the American symbol, rather than the bald eagle. Both Franklin and the ornithologist Audubon pointed out that the eagle, a pirate and a thief, was not an especially flattering or fitting emblem. They both maintained that the turkey, which at least does not poach on his neighbors' preserves, was more appropriate.

The highest tribute we pay the turkey is to eat him with gusto. And this observance has a fitness all its own. It is certainly an honor we would never pay an eagle.

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MEDICINE

Artery Hardening Aids

➤ TWO chemical weapons against arteriosclerosis, popularly known as hardening of the arteries, were announced at the meeting of the American Society for the Study of Arteriosclerosis in Chicago.

One of them is choline, already famous for its value in preventing fat deposits in the liver. This chemical has been cutting the death rate and saving lives in a serious form of heart disease, Dr. Lester M. Morrison and William F. Gonzalez of Los Angeles reported.

They gave it daily to 115 patients who had recovered from an acute attack of coronary thrombosis and myocardial infarction. This is the disease in which a blood clot forms in one of the arteries supplying the heart muscle with blood. Because the clot obstructs the artery, the part of the heart it should nourish dies.

Some of the patients, 52, got the choline for one year, another group of 35 got choline daily for two years and a third group of 28 were given it for three years.

Comparing these patients with another 115 who had the same kind of heart disease but did not get choline treatment showed that "the subsequent mortality rate of patients was significantly reduced under the choline treatment," the Los Angeles doctors reported.

They believe the chemical has value in the treatment of hardening of the heart's arteries and should be given further trial.

The second chemical weapon against hardening of the arteries is one of the B vitamins, inositol. Its value as "a potential

weapon" against one of the factors believed responsible for the most common variety of hardening of the arteries was reported by Drs. Irving Leinwand and Dan H. Moore of New York.

In this form of arteriosclerosis, fatty cysts form in the connective tissue of the artery walls and the tissue undergoes fatty degeneration. Faulty handling of fat by the body is believed to play some part in the development of the condition.

Drs. Leinwand and Moore gave inositol three times a day to patients suffering from some disorder of fat utilization. No special diet was ordered. The results as shown by studies of the blood serum led the doctors to believe the chemical would be useful in the special form of arteriosclerosis.

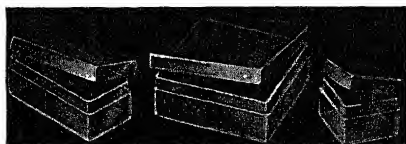
Headache and gastrointestinal upsets of diarrhea occurred as side reactions to inositol in a small percentage of cases.

Further evidence for the reasonableness of treating this kind of arteriosclerosis with diet, exercise and in some cases with pancreatic extract was reported by a group of researchers, headed by Dr. Joseph B. Wolfe, from the Wolfe Clinic and Temple University, Philadelphia.

They got their evidence from studies of geese and ducks. Wild ducks, they found, rarely developed the artery condition compared to its occurrence in domesticated ducks and geese. When the condition was brought on in the geese by forced feeding, it could be reversed and cleared up by diet, exercise and pancreatic extract.

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THE STAR KINGS—Edmond Hamilton—*Fell*, 262 p, \$2 50 A romance based upon space-travel in the future

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Grange—*Scribners*, 365 p, illus, \$6 00 Gives details on how wild creatures live, why the number of game species fluctuates violently from time to time, and suggestions on what can be done to create wildlife abundance

Science News Letter, November 19, 1949

MEDICINE

Stomach Moved to Throat To Save Cancer Patients

➤ AN operation in which the surgeon moves the patient's stomach almost into his throat, to save him from cancer death, was described at the meeting of the American Cancer Society in New York

The operation is for patients with cancer of the esophagus, or gullet Almost all the esophagus is removed Then, instead of giving the patient a rubber tube substitute esophagus on the outside of his body, the surgeon moves the stomach up as far as necessary in the chest and connects it with the stump of the esophagus at its upper, or throat, end.

A substantial cure rate for cancer of the esophagus is being achieved by this operation, Dr. John H Garlock of Mt Sinai Hospital, New York, reported

Science News Letter, November 19, 1949

CHEMISTRY-PUBLIC HEALTH

"Nerve Gas" Safety Seen In Our Masks and Clothing

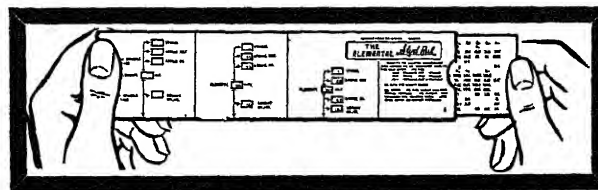
➤ THE "nerve gas" which Britons are reportedly warned against in their new civil defense training manual is nothing we need worry about

Our gas masks will protect eyes and breathing tract against the "nerve gas" and our protective clothing will protect the skin against its effects, it was authoritatively learned from Army Chemical Corps sources in Washington

It is well known that such gases exist and while our own work on them remains on the secret list, the "nerve gas" reported from London does not involve anything unknown to our Chemical Corps experts on gas warfare

Science News Letter, November 19, 1949

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☛ **SOAP SCRAP BAG** makes it possible to use up small pieces of soap even to the last chip. It is a small net bag made from twisted paper cord rubberized with neoprene, and can be used in dishwashing, laundering or bathing, allowing lather to be produced freely by rubbing between the hands.

Science News Letter, November 19, 1949

☛ **WETTING MACHINE** to apply adhesive paste to wall paper, recently patented, is a simple device with a box to hold the paste mixture and two rollers over which the paper is drawn. The first roller, which dips into the paste, brings the adhesive to the paper, the second completes its spreading.

Science News Letter, November 19, 1949

☛ **GOLF BALL COLLECTOR**, for use on driving ranges where there are widely scattered balls to pick up, is a two-wheel affair, lawn-mower-like, with flexible fingers on the rotating axle to drive the balls up a ramp of wires to a receiving basket. Grass and dirt are sifted out in this newly patented device.

Science News Letter, November 19, 1949

☛ **VERTICAL BLINDS** that combine curtains, draperies and blinds in one unit, as shown in the picture, have upright plastic strips that form the louvers. Pressure on a



concealed control rod opens or closes the louver to any degree, and each of these fabric parts may be removed for cleaning by slipping it from tiny hooks at the bottom and top.

Science News Letter, November 19, 1949

☛ **ALUMINUM DIVING BOARD** for the swimming pool has plenty of strength and

spring for all sorts of fancy diving and, in addition, can never become waterlogged and is resistant even to saltwater corrosion. It is made of three sizes of square drawn tubing, telescoped together.

Science News Letter, November 19, 1949

☛ **PAINT BRUSH COVER**, recently patented, is designed to keep the bristles in condition for reuse after the brush has already been used. It is an airtight elastic sheath with a reduced neck to fit the handle and a skirt at the other end which can be folded back to overlap one side of the sheath.

Science News Letter, November 19, 1949

☛ **FLAG LIFTER** for rural free delivery mail boxes automatically raises the flag when the box is opened. The flag remains raised even when the box is closed until lowered manually by the housewife.

Science News Letter, November 19, 1949

☛ **HEARING AID**, for use in auditoriums by persons with normal hearing, is a complete tubular unit, vest pocket size, which contains microphone, batteries and complete transmitting system to lead magnified volume direct into the ear. In use it is merely held to the head, with a conductor inserted in the outer ear.

Science News Letter, November 19, 1949

Do You Know?

Very few women drove automobiles before the self-starter was invented.

Golf balls owe their brilliant white to paints containing titanium oxide.

Birds have been observed at Yellowstone's Mammoth Hot Springs Terraces standing in the clouds of steam and seeming to be enjoying a Turkish bath.

Vanillin, ethavan and coumarin, all long used to enhance the aromas of food, are now used to add a fragrant odor to paper to be used to wrap candy, cookies and ice cream.

Smog is usually thought of as a combination of smoke and fog but smog forms over areas where there is little smoke; dusts and industrial fumes are thought to be responsible.

Wooden beer barrels have a life of about six years, the stainless chromium-nickel steel barrels now used have a life three times as long and they are only one-half as heavy.

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NOVEMBER 26, 1949

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



Raindrop Explosion

See Page 342

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VOL. 56 NO. 22 PAGES 337-352

NUCLEAR PHYSICS

Water Drop-Atom Analog

Calculations of forces acting when a water drop splits in a pattern like that occurring in atomic fission may help to interpret the nature of the atomic nucleus.

► HOW the nucleus of an atom of uranium or plutonium splits in two with release of immense energies may be more easily understood as a result of 12,000,000 calculating operations just completed on forces which act when a drop of water splits

The research, advancing the validity of a liquid drop as interpreting the nature of an atomic nucleus, was planned and directed by John A. Wheeler, professor of physics at Princeton, who played a major role in the development of the atomic bomb, and David L. Hill, assistant professor of physics at Vanderbilt University

In 1935, the renowned Danish physicist, Neils Bohr, suggested that scientists could simplify their thinking if they likened the nucleus of an atom to a simple drop of liquid. Based on this analogy it became possible to predict the fission of plutonium long before that element was known to exist

Using the water drop analog, Prof. Wheeler and Mr. Hill calculated the forces, moments and velocities which would act on 11 points around the periphery of the drop. These were coded and fed in the form of a perforated tape to the selective sequence electronic calculator of the International Business Machines Corporation

Six month's work was required to establish the codes. From then on the 12,500 electron tubes with their 23,000 relays, installed at a cost of \$750,000, operated the numerical printers reeling out figures readily related to the drop as it changes

its shape, constricts near the middle and finally splits, somewhat like the familiar mitotic cell division one sees in biology texts

A hundred different shapes as outlined by the 11 points gave an equivalent of a slow-motion moving picture

The results of the research show that when a drop of liquid splits the masses are unequal, substantially in the same ratio as occurs in atomic fission, that is a 3-to-2 mass ratio that occurs 500 times as often as a 1-to-1 mass ratio

The nucleus of the isotope of uranium, U-235, the stuff from which the atom bomb was made, is held to be dumbbell shape. It takes more energy to split this nucleus, Mr. Hill said, than it would to split a perfectly spherical nucleus such as one might find in a hypothetical element, cosmium, entirely unknown, but which would have a theoretical atomic number of around 125 or 126

The electronic calculator on which the work was done is said to be the only one capable of solving this sort of problem in atomic physics. The solution required 103 hours with an expenditure of 15,000 kilowatt hours of current, about as much as would be required to operate 150 household electric irons for 100 hours. The same calculations would have taken a high speed operator working with the best office type machines 150 years to complete, provided he made no mistakes. The calculator double checks on itself all along the line and stops dead if the figures do not tally

Science News Letter, November 26, 1949

ENTOMOLOGY

Locust Swarms Predicted

► "THEY will come out of nowhere, without warning, by the billions, by the trillions. In the air there will be swarms of them 50 miles long, five to 10 miles wide and a mile or two deep"

This prediction of locust plagues to come, rivaling those of the biblical past, is from Dr. Clearhos Logothetis, FAO locust expert, reporting back from specially called locust control conferences in Pakistan and Lebanon.

He called the locust the "most important insect pest in the world today." It eats up millions of tons of food, consuming whole harvests at one feeding. He estimates the worldwide cost at "a bare minimum of \$40,000,000 a year, which does not take into account the severe economic disloca-

tions that result when an entire harvest is wiped out"

In the Near and Far East, and in Africa, Australia and South America locusts appear in unpredictable cycles, disappearing almost completely for a couple of years and then suddenly reappearing to do terrible damage

He warned that the locusts will come again for a certainty until countries jointly ferret out and destroy the breeding grounds out of which they come sweeping

It is now believed that locusts have relatively few points of origin, where they rest and build up their numbers between outbreaks. One such area is thought to be the Arabian desert. For reasons that are little understood, Dr. Logothetis explained, the

Arabian locusts will suddenly start to breed prolifically, to change color, to become restless

Their numbers grow enormously, until, as at a signal, the huge horde rises into the air, heading east. These migratory locusts eat their way from Iran, through Pakistan, into India. These three countries are now joining forces in an attempt to prevent the airborne attack from getting under way in the first place

Science News Letter, November 26, 1949

AERONAUTICS

JATO and Parachute Brake Are Features of Jet Plane

► ROCKETS may be used to give rapid take-off to the new three-engine jet XB-51 plane built by the Glenn L. Martin Company for the U. S. Air Force, and a unique ribbon-type parachute braking technique will cut speed rapidly on the landing runway, it was revealed in Baltimore, Md.

Bringing a speedy jet plane to a stop on any but long runways is one of the problems encountered in promoting the use of turbo-jet power for planes. Airliners with conventional reciprocal engines and the familiar bladed propellers can be brought to a stop by the use of reversible propellers to assist the brakes on the wheels of the landing gear

Considerable experimentation has been carried on during the past few years to find a way to cut the speed of a jet-propelled plane after it hits the landing strip. The trailing parachute is one. Another suggested is the use of rockets attached to the plane and pointed to the rear.

Rocket assisted take-off, JATO for short, is being used with considerable success with many new types of planes. The rocket power enables heavily loaded planes to get into the air which might not be able to do so otherwise. Rocket-assist enables other planes to take off after a shorter run than would be required without their help

A new Junior Jato, stovepipe size and 18 inches long, develops 250 pounds thrust for 12 seconds duration. It is a product of Aerojet Engineering Corporation, Azusa, Calif. A Ryan Navion, equipped with Junior Jato, in a recent test reached a 50-foot altitude in only 300 feet from its starting point

The 80-foot Martin XB-51, now undergoing testing, was designed for use in destroying surface installations in cooperation with ground troops. It is a speedy plane with three General Electric J-47 jet engines. It has wings and tail of the swept-back type, both at angles of 35 degrees. This new bomber has a parachute stowed aft which may be released at the pilot's discretion for more rapid deceleration of speed, in the air or on the runway. Neither Jato nor parachute are intended for use except in unusual situations

Science News Letter, November 26, 1949

GENERAL SCIENCE

Fleet Bombing Obsolete

High-speed guided missiles, prime defensive weapons, now allow relative freedom from fear of atomic bombing by fleets of bombers.

➤ BOMBING by air fleets of the speeds and altitudes of the last war is now obsolete against a fully prepared and alert enemy.

Because of this "logical conclusion," Dr Vannevar Bush, head of American scientific research and development in the last war, believes that "we have less reason to be terrified by the thought of the A-bomb delivered by fleets of bombers."

Discussing this fear of many people today, Dr Bush in a book just published, *MODERN ARMS AND FREE MEN* (Simon and Schuster), analyzes the changes caused by the advent of atomic energy applied to warfare.

Delivery of A-bombs by bombers can not be entirely discounted, but he writes that "the specter of great fleets of bombers, destroying great cities at will by atomic bombs is a specter only."

The high-speed guided missile is a prime defensive weapon that promises to neutralize the high-flying bombers. Says Dr Bush:

"The high-speed guided missile can be used locally, like a gun, or carried to a threatened spot or fired from a plane. It has not the gun's limitations on ceiling and can go as high as the bomber. Its speed of a bullet pretty well guarantees it against being shot down in flight. Jamming is difficult. It is directed into its target and carries a proximity fuze. For defense of restricted areas it promises to be a deciding factor. It can be used air-to-air, but here again the interceptor can use it to better advantage than the bomber."

This guided missile, Dr Bush indicated, should be ready for war use by the time there are great stocks of atomic bombs.

In his opinion, "it may well render all conventional mass bombing obsolete when two highly technical, alert and industrially advanced combatants clinch."

Despite this new method of defense, Dr Bush warns that an enemy might with great losses get through to highly important targets. The means of defense is highly expensive and it must be alert, he observes. There are other means of delivery of atomic bombs than dropping them from the air, such as sneaking them into harbors in ships and planting them at the bottom of rivers.

Sneak raids and surprise attacks must be guarded against. The sneak bomber coming in at low altitude to avoid radar warning and too low to be fired upon effectively by batteries of guns and missiles might carry an atomic bomb to a target, even if it were destroyed itself in doing so.

Bombs might be lobbed into coastal cities by rocket projectors perhaps from submarines 25 to 50 miles at sea, Dr Bush says in his book.

The question of whether germ or biological warfare will be used in the future depends, in Dr Bush's opinion, upon whether an enemy can deliver the old and the newer toxic materials effectively. He does not believe that mass delivery in an effective method is feasible, and biological weapons are not the absolute weapons, but more important in subversive operations than in open all-out combat.

Science News Letter, November 26, 1949



LIFESAVING "DOUGHNUTS"—The Sikorsky HO4S-1 helicopter equipped with a utility flotation gear employing carbon dioxide inflation, rides like a boat on the water after an emergency landing. Four inflatable bags, or "doughnuts," two flanking the forward wheel and one each on the two rear wheels, are connected by flexible hose to Kidde carbon dioxide cylinders with special discharge heads in the cockpit. The weight of the flotation gear is less than 150 pounds, and it not only permits take-off from calm or rough water, ice or snow but saves lives and aircraft in forced landings at sea.

NUCLEAR PHYSICS-METEOROLOGY

Industrial Atomic Energy Use Brings New Science

➤ THE development of atomic energy for peacetime industrial uses will make "stack meteorology" an important science of the future.

Norman R. Beers, editor of *NUCLEONICS Magazine*, at the National Air Symposium, Pasadena, Calif., predicted that large atomic energy plants will put in the air materials that are either unusually toxic for chemical reasons or measurably radioactive.

Mr. Beers defined "stack meteorology" as "the entire problem of air pollution from stacks of chimneys as the meteorologist sees it."

The fogging of photographic plates occurred a thousand miles from the first atomic bomb explosion in New Mexico, Mr. Beers recalled. Dust from the great Krakatoa volcano has travelled around the world. Industrial smoke and fumes are likewise carried greater distances than is generally realized.

"Aviators have seen smoke from large cities adequate to dirty their windshields and to decrease visibility up to 300 miles away from the smoke source," he said.

Science News Letter, November 26, 1949

AERONAUTICS-MEDICINE

Safer Parachute Jumps

► **HIGH** priority for the problem of getting a man safely down after he parachutes from a plane was urged by Comdr H A Smedal of the U S Navy Medical Corps before the Association of Military Surgeons meeting in Washington, D. C.

He stressed this because most of the emphasis has been on the safe escape from a plane using such devices as the ejection seat.

The parachutist faces possible shock when he first leaves the plane, Comdr Smedal said. Moreover, the parachute harness places the impact of the opening on the crotch and thighs. Other parts of the body may also get part of the impact with the air or with parts of the parachute as it opens and injury may result.

He makes the following suggestions to protect the body against the shock of the parachute opening: 1. distribute the area

of impact over a larger part of the body, 2. place the impact load on the parts of the body best able to stand it and near the center of gravity of the body, 3. lessen the extent and duration of the force, 4. orient the body in taking the proper position for opening of the parachute which is the vertical position.

Few of the suggested improvements have been made, he said. Parachutists still have narrow harnesses which cause local injuries. A rip-stop nylon parachute has been developed which gives a softer and surer opening, and decreases the rate of descent by about 15%. Automatic opening devices have been made but they do not always work.

Among other unsolved problems is the one of the jumper striking the ground and fracturing his legs.

Science News Letter, November 26, 1949

R Bierman. A part of the continuing research has been published in the *AMERICAN HEART JOURNAL* and the *TRANSACTIONS OF THE ASSOCIATION OF AMERICAN PHYSICIANS*.

The measurements were made by means of the sphygmophone, a special type of double stethoscope for comparing sounds and indicating their direction, developed by Dr. Keri, and by means of electronic devices and strain gauges applied to the measurement of physiological pressures.

Science News Letter, November 26, 1949

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MEDICINE

Theory of Heart Murmurs

► **A TEAM** of physicians using a new type stethoscope and modern electronic devices have upset the predominant theory by which doctors have explained how the blood vessels transmit heart murmurs.

Heart murmurs, as heard by the stethoscope, long have been considered to be transmitted as sound through the blood vessels. Heart murmurs are the distorted sounds set up in the cardiovascular system by damaged hearts, blood vessels, or by obstructions.

The team of physicians, at the University of California Medical School, determined that the murmurs travel only one one-hun-

dredth as fast as the speed of sound in blood vessels.

The physicians found that the murmurs traveled at almost identically the same speed as, but slightly slower than, the pulse wave, which is the forward impulse set up in the blood vessels as the heart pumps blood.

They concluded that the murmurs actually travel on this pulse wave. The information is important in the diagnosis of heart ailments.

The team of physicians was headed by Dr. William J. Kerr, and included Drs. Vernon C. Harp, Elliot Rapaport and Howard

Question Box

CHEMISTRY

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ENGINEERING

Of what material is the fireproof suit made? p. 343.

GENERAL SCIENCE

Why is fleet bombing obsolete? p. 339.

GEOLOGY

Why was an iceberg census taken? p. 341.

Photographs: Cover, W. D. Ellison and Naval Research Laboratory, p. 339, Walter Kidde Public Relations; p. 341, U. S. Coast Guard, p. 343, USAF Air Materiel Command.

MEDICINE

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What condition may lead to hardening of the arteries? p. 343.

NUCLEAR PHYSICS

What research may help in understanding the atomic nucleus? p. 338.

MEDICINE

Tibione May Fight TB

Treatment of TB with a new German synthetic drug has given "most impressive" results. It would be used together with streptomycin in TB treatment.

➤ A NEW weapon may soon be available for the fight against tuberculosis. It is a German synthetic drug called Tibione.

More than 7,000 patients have been treated with the drug in Germany during the past two years, with "most impressive" results in some forms of tuberculosis.

Tibione is untried and almost unknown in this country. But at the Eighth Streptomycin Conference in Atlanta, Ga., Drs. H. Corwin Hinshaw of the Mayo Clinic, Rochester, Minn., and Dr. Walsh McDermott of the New York Hospital—Cornell Medical Center, New York, reported results of a survey they made in Western Germany in September of the trials German physicians have made of Tibione.

"Tibione," Dr. Hinshaw said, "appears to have antituberculous activity of the same general order as para-amino-salicylic acid and a potential toxicity about like the arsenicals used in the treatment of syphilis."

If no "superior" anti-TB chemicals are developed, he said, a drug with these apparent degrees of anti-TB activity and toxicity would be "an important addition" to currently available germ-fighting chemicals.

"It is virtually certain," he declared, "that Tibione will not replace streptomycin but would be used together with streptomycin in the treatment of tuberculosis."

The American physicians were most impressed with the results obtained in Tibione treatment of certain serious complications of extensive tuberculosis of the lungs, especially tuberculosis of the larynx (voice box) and of the intestinal tract.

The drug is not sufficiently powerful to have much effect on most cases of tuberculous meningitis and miliary (not military) tuberculosis. German physicians now give streptomycin to these patients.

Tibione is neither as dependable nor as rapid in its action in tuberculosis of the lungs as streptomycin.

If, as seems likely, TB germs do not develop resistance to Tibione and the drug does not produce serious toxic effects, it could be depended on to continue fighting the germs for many months of treatment. This would give it "very great usefulness" in many chronic types of tuberculosis for which streptomycin usually cannot be prescribed.

Tibione was developed by Drs. Robert Behnisch and Fritz Mietzsch and Prof. Hans Schmidt of the Bayer Company. Its effectiveness against the TB germ in the test tube and in animals was discovered by Prof. Gerhard Domagk, who was awarded the Nobel Prize in 1939 for his discovery of the anti-germ activity of the sulfa drugs.

Drs. Hinshaw and McDermott made their survey as consultants for Schenley Laboratories. Schenley will make the drug available to certain government agencies, tuberculosis research organizations and other qualified clinical investigators for trials and study in this country. If the German results are confirmed, Schenley will produce it for use by physicians in the United States.

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from two widely separated special broadcasting stations. Loran can be used when the sextant is useless because of fog or darkness. It is a particularly desirable device for use in the North Atlantic, an area blanketed by fog from April to July each year.

Two converted Air Force B-17s were used in the aerial iceberg count. Cameras were installed in plexiglass bubbles on each side, and thousands of pictures were taken. The only sure sign of an iceberg is to see it, the Coast Guard declares, but the camera "sees" it better than the human eye.

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MEDICINE

New Chemical Effectively Treats Many Allergies

➤ GOOD results with a new, longer acting chemical for hay fever and other allergies were reported by Drs. Louis Cullick and Henry D. Ogden of Louisiana State University Medical School and Charity Hospital, New Orleans, at the meeting in Cincinnati, Ohio, of the Southern Medical Association.

The chemical is Perazil chlorcyclizine. It is an anti-histamine chemical but differs from others developed in the fight against hay fever, asthma and so on in its longer action. This means that patients need take only one or two tablets daily.

The 30 patients, 27 with hay fever,



LAST ICEBERG—A member of the veteran ice patrol aboard the Coast Guard cutter, *Evergreen*, keeps his eye on the last iceberg of the season. Disposing of this one did not spell *finis* though, for when the ice patrol ends, it is only the beginning of the iceberg census which counts the bergs constituting a potential menace to North Atlantic shipping.

GEOLOGY

Iceberg Count Made

➤ ANOTHER government census is now completed and a summary issued. It is the "iceberg census" of the Baffin Bay region. The count, taken by aerial photography, totals 40,232 icebergs during the 1949 operation. These bergs later may become a menace to shipping in the Atlantic.

This iceberg count job is a function of the U. S. Coast Guard. Counting is done to anticipate and forecast ice menace to North Atlantic shipping. Many hundreds of those spotted will disintegrate on the 2,000-mile trip before reaching the shipping lane. Others will not. Danger from them to ocean vessels on the usual routes from the United States to Europe is kept at a minimum by the iceberg patrol kept by

the Coast Guard during the iceberg season.

Greenland glaciers are responsible for the North Atlantic iceberg menace. Twenty of them on the west coast along Baffin Bay are responsible for most of the icebergs that drift toward the Grand Banks off Newfoundland in the shipping lane. Coast Guard units in surface ships and airplanes keep careful watch for these great masses of ice during some five months of the year. Their exact geographical location is determined by sextant or Loran and widely broadcast by radio for the benefit of vessels.

The use of Loran for this purpose is a postwar application. Loran itself is a wartime development. It enables a vessel to get its location by intercepting radio beams

to whom the New Orleans physicians gave these tablets got only one week's supply at a time. The second week they were given a supply of tablets that looked just like the Perazil but did not contain any of it or any antihistaminic chemical. The following week they again got Perazil tablets, and so on for 14 weeks. The patients did not know they were getting different tablets every other week. They were also given a chart on which to record the time of onset of each attack of hay fever, hives or rhinitis, the duration, and whether it was mild, moderate or severe.

Although there was no significant difference in the mild and moderate symptom

groups while on Perazil and the dummy tablets, the attacks lasted longer when patients were taking the dummy tablets.

There was, however, a marked difference in severe symptoms, 26 hours per week, roughly, when taking Perazil, compared to about 171 hours on the dummy tablet. Also, the number of hours of all kinds of symptoms, mild, moderate and severe, averaged 209 per week for each patient taking Perazil and 521 for the patients while taking the dummy tablets.

The scarcity of side reactions "is worth noting," the doctors pointed out. Of 30 patients, only four reported drowsiness and and one headache.

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ENGINEERING

Football Players' Device

➤ FOOTBALL coaches and fans, attention have you heard of the ammonia gas-filled earpiece inside a helmet by which a quarterback on the field could receive instructions from the bench?

Such a device has actually been patented by Dr. W. D. Hershberger of the engineering department of the University of California at Los Angeles.

The U. C. L. A. engineer, who helped to devise the fabulously accurate atomic clock, says that the principle on which the clock works can be utilized in a practical bench-to-huddle "intercom" system.

This principle is the absorption of microwaves by the ammonia molecule. Put a narrow-beam voice-modulated microwave generator on the bench and the ammonia gas-filled earpiece in the quarterback's headgear and the coach could communicate with the huddle at will.

"It might save penalties against the team

when substitutes are illegally sent in with instructions from the coach," he suggests.

The scholarly research engineer, who spends most of his time on more serious applications of this principle, has conceived of other gridiron applications of the same idea.

Fill the pigskin itself with ammonia gas, says Dr. Hershberger, and the quarterback wouldn't even need an earpiece in his helmet. When the ball was cocked behind his ear he could get such instructions from the bench as "the end going wide to the left is now open for a pass" or "beware of the opposing tackle coming in on your right."

One other variation is this: when the ammonia-filled ball was in the air, the coach could speak directly in code to the end going down field. Thus he would have more time to fake the defensive halfback instead of twisting his head around to look for the ball.

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CHEMISTRY

Better Shoe Soles Made

➤ BETTER soles for shoes result from impregnating leather with natural rubber in a process developed by the National Bureau of Standards just revealed.

Tests already made show that the rubber-treated leather soles have improved wearing qualities over untreated leather and are better able to resist abrasion and water.

Sub-standard leather, such as "belly-cuts" from steer hides, make satisfactory soles after the rubber treatment and can now be used for the purpose.

The new treatment process was developed by Rene Oehler, Timothy J. Kilduff and Sverre Dahl of the Bureau staff. The impregnation is accomplished by simple immersion of the naturally porous leather in a solution of natural rubber. Solutions have been made with guttapercha gum, Hevea, and Castilla rubber. Hevea smoked

sheet rubber proved to be the best of the group for the purpose.

After impregnation the deposited rubber may be vulcanized at 80 degrees Centigrade with the aid of an accelerator of the dithiocarbamate type without harming the leather.

In the development work it was found that if the grain layer of the leather is split away and the body of the leather is allowed to remain in solution overnight, the penetration and distribution of the rubber are greatly improved.

Tests show that water transmission and absorption of the rubber-treated leather are only 50% as much as untreated specimens, and that abrasion resistance of vegetable-tanned crust leather is improved from 50% to 100%, depending on the type of rubber treatment used.

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Words in Science— CATHODE RAY TUBE

➤ THE cathode ray tube is a bulb of glass that contains a high vacuum. Electrons are shot out by a heated filament at the base of the tube toward an anode. A narrow beam of electrons passes through a small hole in the anode and continues on to the end of the tube which is a screen coated on the inside with a substance which fluoresces (glows) when the electrons strike it.

The cathode ray tube is the heart of your television receiver. In use, the bright spot caused by the stream of electrons sweeps rapidly over the screen while its brightness is controlled to match variations in brightness of the object televised.

Persistence of screen fluorescence plus persistence of vision make you have the illusion of an image on the television screen.

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MEDICINE

More People May Soon Be Vaccinated Against TB

➤ MORE people may soon be getting vaccinated against tuberculosis as a result of action by the National Tuberculosis Association.

That organization's medical section, called the American Trudeau Society, recommends that commercial firms be licensed to produce BCG, the anti-TB vaccine, as soon as suitable standards for its production can be set up.

BCG, short for *Bacillus Calmette-Guérin*, is made from cow tuberculosis germs that have lost their virulence, or ability to produce disease. The vaccine is the most practical known material for giving immunity to tuberculosis and has been widely used in Europe.

In the United States the vaccine has been restricted to use in controlled, scientific studies because of many unanswered questions about its value. It is given only to persons who do not react to a tuberculosis skin sensitivity test.

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On This Week's Cover

➤ THE gentle pitter-patter of raindrops is an illusion of the eye and ear, for each raindrop smashes into the soil like a bomb, scattering bits of shattered earth. This explosive action is demonstrated in the picture, shown on the cover, made with a stroboscopic camera by W. D. Ellison, soil conservationist with Navy's Bureau of Docks and Yards, in cooperation with a Naval Research Laboratory photographer. The effect of exploding raindrops on the soil known as splash erosion is a prime force in soil displacement.

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MEDICINE

Atherosclerosis Theory

Fat particles circulating in the blood may lead to hardening of the arteries. Lipase and a detergent, Tween 80, reduced the particle count in older persons.

► FRESH evidence for the theory that fat particles circulating in the blood lead to a kind of hardening of the arteries, called atherosclerosis, appears in studies by Drs G H Becker, Jacob Meyer and H Nechels of Michael Reese Hospital, Chicago

Two chemicals, a fat-splitting ferment called lipase and the detergent, Tween 80, seem potential drugs for preventing the condition or arresting its progress, although the scientists say "it is premature to speculate" on this

A test meal of white toast spread with oleomargarine and a cup of tea was used in the studies, reported in the scientific journal, *SCIENCE* (Nov 18) After this meal, the number of fat particles in the blood of younger people rose to a peak within two to three hours and returned to the fasting level by the end of the fifth hour But in the older people the number of fat particles did not reach their peak until eight or 12 hours and did not return to fasting level until 24 hours had elapsed Also the total number

of these fat particles was consistently and considerably higher in the older persons than the younger ones

Feeding either lipase or Tween 80 with the fat meal reduced the number of fat particles in the older people's blood to practically that of the younger age group But the count of fat particles in the young group following the fat meal was not much affected by giving lipase

The effect of lipase or the detergent on the number of fat particles in the blood of the older people seems to support the idea that mechanisms of fat digestion or absorption, probably both, change with aging, the scientists point out

"Since all people eat some fat at least once a day," they state, "increased numbers of fat particles circulate in the blood of older persons practically permanently. If it is true that particulate fat, circulating in the blood, leads to atherosclerosis, the condition leading to that degenerative disease has been found"

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ENGINEERING

Energy Wastes from Fuels

► TWO-THIRDS of the energy from the coal, oil and gas consumed in the United States is wasted in stack gases or exhaust gases or radiated to the air, four scientists of Socony-Vacuum Oil Company told the American Petroleum Institute in Chicago

The remedy lies in better usage and they explained how this can be accomplished, particularly in the automotive and entire transportation field The presentation was a joint paper by W M Holaday, R E Albright, T. L. Appjohn and L R Steffens, all of the Socony-Vacuum Laboratories, New York

According to these authorities, energy is derived in this country principally from coal, petroleum and natural gas, with water power and wood supplying about 10% Petroleum and natural gas together account for about 50%, coal supplying the largest portion for industrial power and heat.

Transportation requirements, amounting to 36% of the country's net energy needs, appear to be subject to the greatest reduction through improvements in utilization efficiency Automotive equipment offers the most fertile field in this area, they stated Present weighted overall efficiency under normal operating conditions is only six percent

One manner of increasing automotive efficiency is by raising compression ratio in engines An alternate to increasing compression ratio is the application of supercharging One means for improving economy is the use of a smaller engine which would operate without supercharging most of the time but would use this power-boosting device when high power is required

A more recent proposal is based on the use of a small continuously supercharged engine and recovery of the exhaust-gas energy in a gas turbine geared to the engine In effect, this would give the higher efficiencies obtainable at high compression ratios, but without the higher octane-number associated with increase in compression ratio

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ENGINEERING

Glass Fiber Is Key To Fire-Protection Suit

► GLASS fiber is the key to a protective suit that will enable a man to work in safety in a raging fire It was developed at the Wright-Patterson Air Force Base, Day-

ton, Ohio, and is designed particularly to keep aircraft firemen safe when working in a fire of gasoline and oil

The suit is made up of 18 layers of glass fiber, glass fiber batt, glass fiber net, neoprene-coated glass fiber, honeycombed cotton cloth, silver foil, aluminum foil and nylon, Air Force officials state These materials are arranged so that they provide the best possible protection yet devised against both the conductive and radioactive heat experienced in aircraft fires

In all, the suit is about one-half inch thick, and gives the lowest possible bulk and weight consistent with its insulating function The material is able to withstand abrupt and extensive changes in temperatures without loss of physical characteristics It is not injured by water, oil, common solvents, fuels, lubricants or fire-fighting agents

The suit, complete with asbestos-soled shoes, head covering and mitten-type gauntlets, weighs 29 pounds Under tests, a man wearing this protective suit remained a minute and a half in a wall of flame at 2400 degrees Fahrenheit without experiencing bodily discomforts

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FIREPROOF SUIT—This gleaming white suit made of 18 layers of various glass fiber materials and aluminum foil arranged to provide the best possible protection against both conductive and radioactive heat is the first ever designed by the Air Force to permit actual entry into flames. It will be worn by four members of 20-man aircraft crash fire-fighting teams recently organized by the U. S. A. F.

ASTRONOMY

Two New Minor Planets In Trojan Group Reported

➤ TWO new minor planets, whirling around the sun, 60 degrees ahead of Jupiter but following the same orbit, have been reported to Harvard Observatory, Cambridge, Mass., by Dr. K. Reinmuth of Heidelberg, Germany.

Confirmation of their existence by American observers is expected as soon as conditions for photographing this region in Jupiter's path allow astronomers to take pictures of these very faint objects. Magnitude of the yet un-named asteroids is about 15, thus requiring a fairly large-sized telescope for observation.

Dr. Reinmuth was the discoverer of another asteroid, named Hermes, that holds the present record for the closest approach to the earth. On Oct. 30, 1937, this little celestial body, with a diameter estimated at only one mile, came within 485,000 miles of the earth. This is closer than any other object in the sky, except the moon, has ever approached the earth.

The two new asteroids are part of the Trojan group, named after the heroes of Homer, and occupy a fixed position with respect to both Jupiter and the sun. There are now 12 known asteroids of this group, the first having been reported in 1904, after its existence was predicted by the French mathematician LaGrange.

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METEOROLOGY

European Meteorologists May Use Hemisphere Data

➤ IF Europe becomes international in its weather forecasting, people on the other side of the Atlantic will have more chance of knowing in advance what the weather is going to be.

This was learned by an American meteorologist, Jerome Namias, long-range forecasting expert of the U. S. Weather Bureau, during an eight-month study of European weather practices.

America's weather maps are based on data collected from the whole Northern Hemisphere. Europe's maps are drawn chiefly from local European data. By employing the hemisphere concept, Europe will obtain a larger and therefore more accurate picture of future weather.

European meteorologists, Mr. Namias found, were highly receptive to the hemispheric concept. The biggest obstacle to putting it into immediate operation, they told him, is the cost. Data from weather stations which girdle the Northern Hemisphere are already available. But properly equipped collecting and transmitting stations are costly. There is also a shortage of trained personnel needed to appraise and interpret the data.

Some steps have already been taken to overcome this difficulty, notably by the International Meteorological Organization which has placed this problem high on its agenda.

Since 1935 when the hemispheric idea was first jointly explored by the Weather Bureau, the Department of Agriculture, and Massachusetts Institute of Technology, the original North American system of weather stations has been widely enlarged. It received an additional impetus during the war, until now it includes a far-flung network of weather ships, upper-air sounding stations, and other observation points scattered throughout the North American and Eurasian continents.

All these observations of local weather conditions and of air circulation are sent by radio so they can be received by all countries, including Russia and the nations of Europe. They are used in making the weather predictions that help keep the air lines running. Prediction charts of general weather conditions four and five days ahead are made and longer-range forecasts are also possible.

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PSYCHIATRY

Share and Discuss Worries and Anxieties

➤ BEST thing to do for the worries and anxieties of daily life is to share and discuss the worrisome problem or situation, two University of California psychiatrists conclude from a special study of worry.

The following ways of handling worry are not grown-up and not effective, the psychiatrists, Drs. Jurgen Ruesch and A. Rodney Prestwood, state:

Overindulgence in eating, drinking or smoking, trying to suppress or conceal the worry, trying to establish a feeling of "belonging" by social contacts, from conversations about the weather to club activities, trying to control the actions of friends or relatives or dictating to them.

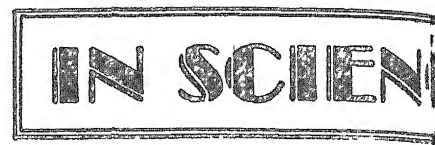
They report their study in the current issue of the ARCHIVES OF NEUROLOGY AND PSYCHIATRY (Nov.), an American Medical Association publication.

A new cause for worry for some people appears in a report to the same journal by Dr. Herbert Barry, Jr., of Harvard Medical School.

Loss of mothers, through death or separation, at a younger age than eight years may contribute to a later development of mental illness, Dr. Barry found.

Psychiatrists searching for causes of mental illness, he points out, now tend to think there are multiple factors at work instead of just one, and that the periods in life at which psychological hurts occur are also important.

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NUTRITION

High Fat Diets Do Not Always Cause Obesity

➤ TO KEEP from getting fat, you don't have to stop eating fats entirely. People can learn from the rats studied by Dr. Harry J. Deuel, Jr., graduate school dean of the University of Southern California.

While the regulation of diet in a particular case can best be done under medical control, investigations by Dr. Deuel show that high fat diets do not necessarily cause obesity.

High fat diets in animals remain in the stomach over a prolonged period, maintaining satiety for a longer time and thus preventing excessive caloric consumption.

Fats, considered as desirable constituents of the diet, may vary from nothing to a fairly generous amount without appreciably altering the nutritional value of the diet. Fats serve as a source of the essential fatty acids and under certain conditions, of fat-soluble vitamins. They also contribute markedly to the tastefulness of the diet.

In his study of rats, reported to the American Dietetic Association, Dr. Deuel found that diets containing 20% to 40% fat by weight have the highest nutritional value, as judged by growth studies. Capacity for work and survival are more satisfactory for rats on diets containing generous amounts of fat than for animals on fat-free regimes.

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ZOOLOGY

Female Sharks Are More Numerous than Males

➤ AMONG the sharks, the females are more numerous than the males.

Investigating the sex life of the basking shark, Dr. L. H. Matthews of the University of Bristol reported to the Royal Society in London, England, that he has found that the sex ratio in the commercial catch is 30 or 40 females to one male. Just what are the relative numbers at birth is not known.

The shark, although a fish, brings forth its young alive, like mammals and unlike most fish. The mother shark is very prolific so far as eggs are concerned, since she produces at least 6,000,000 at one time, most of which do not develop.

While the mating of the particular kind of shark studied by Dr. Matthews takes place in surface water inshore in the early summer, the expectant mothers seek privacy by migrating elsewhere and do not reappear until after their young are born.

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E FIELDS

VETERINARY MEDICINE

Screw-Worm Infection in Livestock Is Rising

➤ A SERIOUS rise in screw-worm infection among livestock in the Southeast is the object of close government scrutiny, it was revealed in Washington, D C

Although figures are still not available on the amount of damage done, Dr. L S Henderson of the Bureau of Entomology and Plant Quarantine said that this is "the worst year in the history of the insect in the Southeastern area" For the first time infection has been reported in New Jersey, well north of its usual range.

Last year's mild winter is to blame for the current outbreak, Dr Henderson said The infection, which occasionally occurs in man also, develops when the adult screw-worm fly lays its eggs in wounds in the animal's skin If untreated, more eggs are laid, the sore grows and the animal dies The mild weather permitted the adults to over-winter far north of their usual winter refuge, so that when warm weather returned they got off to an early start

No prediction for next year is yet possible It will depend on the severity of the coming winter If it is mild, a repetition of this year's outbreak is highly likely

Livestock acquire wounds in a variety of ways, among them tick bites, goring, bramble scratches, and in the branding and dehorning operations Owners can effectively prevent loss by treating all such skin breaks promptly

A chemical preparation called "Smear 62", developed by the Department of Agriculture, gives good results, Dr Henderson said The important thing, he stressed, is that it be applied in time It has a double action, repelling the egg-laying adults and killing the larvae

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GENERAL SCIENCE

Cigarettes Smoked Hit All-Time High

➤ A RECORD high in the number of cigarettes smoked by the American public was hit this year, figures released by the Department of Agriculture show

More persons are expected to be smoking next year because of population increases, their report also shows.

If every adult in the United States consumes his share this year, each man and woman will have smoked 3,400 cigarettes by New Year's Day, or about 170 packs. This figure includes non-smokers Based on smokers alone, the average consumption

would of course be much higher

Cigarette smoking, says the Department of Agriculture, for the last four years has been double what it was for the five years just before the war Consumption this year totals 358 billion cigarettes For the period 1935 to 1939 the average was 157 billion

The figures are rising in spite of "the higher tax rates or new cigarette taxes levied in seven states, the District of Columbia, Alaska, and Hawaii in recent months" There will probably be even more smokers in 1950 because of the population increase

Cigarette exports for the year are estimated at 21 billion cigarettes, which despite a drop from last year is roughly four times what it was before the war

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SOCIAL PSYCHOLOGY

Radio Give-Away Answers Desperate Need of Many

➤ THE radio give-away program is the one hope for fulfilling some desperate need for many people It is the "good fairy" of this mechanistic age, making the ordinary housewife into a Cinderella

This is the conclusion of Dr Franklin Fearing, professor of social psychology at the University of California Dr Fearing made a study of 16,000 wishes expressed by contestants on one of the oldest give-away programs for which the gifts are chosen on the basis of wishes written out in advance by the contestants

More than a third of the contestants wanted to escape from the humdrum of daily life by way of a special experience such as a trip to Bermuda or a date with a movie star Another 30% wanted some practical thing such as a washing machine or vacuum cleaner Only 13% wanted luxury items like a television set or mink coat, and a mere 4% asked for bizarre or unrealizable wishes

On the basis of the sample interviews, the typical contestant in this program is 29 years old, has gone to high school or college, is married, has one or more children, and is a housewife.

The majority of winners reacted favorably to the experience They felt that in addition to the gifts received, the experience raised them in the opinion of their families, neighbors and friends

A significant minority, however, felt that the ordeal they underwent before the wish was finally fulfilled made its realization an anti-climax Some said it "really wasn't worth it."

Interviews of "also-rans" indicated that frustration of those who almost made the grade, but faltered in the final selection was often a bad emotional experience, and in many cases actually created a serious psychological condition

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ENGINEERING

"Rail Cancer" Is Licked By Controlled Cooling

➤ NO "rail cancer" has been found in any railroad rail made since 1938 with use of a controlled cooling system, it was reported by Prof R E Cramer of the University of Illinois to a joint committee of the American Railway Engineering Association and the American Iron and Steel Institute

Rail cancer is a fatigue failure that comes with usage Studies made in the early 30s by scientists of the University of Illinois found that the cancer began from minute flaws called shatter cracks within the head of the rail, and that controlled cooling could prevent them.

This cooling cure was put into operation by the rail makers in 1935 Of the 10,000,000 rails made since then only seven have failed by cancer, and all seven were rails made before 1938 and all by one mill that used defective cooling equipment Of the rails made before 1935, as many as 40,000 a year are now failing

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MEDICINE

Gas Meter Converted to Lung Function Testing

➤ A GAS meter, such as homeowners have in basement or kitchen, can be converted to an instrument for testing lung functioning, Dr Charles W Lester, of Roosevelt Hospital, New York, reports in NEW YORK MEDICINE, (Nov 20), journal of the Medical Society of the County of New York

About the only test of lung function made in hospitals that do not have elaborate special equipment, Dr Lester points out, is the test of the patient's "vital capacity" This means the measure of the greatest possible amount of air that can be exhaled after the deepest possible inhaling of air

This is of about as much value in estimating lung function, Dr Lester says, as measuring the size of a leg is in estimating its functional capacity

Besides the measurement of the mechanical movement of air in and out of the lungs, the physician needs to know how much oxygen and carbon dioxide pass across the thin membrane separating the blood vessels from the tiny air spaces in the lungs, called alveoli.

It is for this latter measurement that the gas meter with flutter valves can be used, Dr Lester reported. He credited Dr Ralph Friedlander and Dr William M. Chardack of the Veterans Administration Hospital at Castle Point, N Y., for demonstrating the availability of this new lung function testing device

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ASTRONOMY

Orion Prominent in East

The planets of Venus, Jupiter, Mars and Saturn can be seen either early or late. Sirius, one of the closest stars, appears to be the most brilliant.

By JAMES STOKLEY

➤ **THOUGH** four planets may be seen on the evenings of December, one has to look for them either early or late. Thus, they do not achieve a place on our maps, for these depict the heavens as they appear about 10 00 p m at the beginning of the month, and an hour earlier in the middle.

If you look low in the southwestern sky soon after the sun has set you will see two planets in the gathering dusk. The brighter will be Venus, which reaches greatest brilliancy the day after Christmas, when it is about 58 times as bright as a typical star of the first magnitude. The other planet is Jupiter. Though this is really very bright, it is only about a twelfth the brilliance of Venus, which is now at one of its extremes.

At the beginning of the month, Venus will be to the west of Jupiter, but passes it on the evening of Dec 6. The time of closest approach (10 00 p m EST) will be after the planets have set in the eastern part of the country, but in the west they will still be visible. Even along the Atlantic coast, however, they will form a strikingly close pair that evening before they disappear behind the western horizon. And on Dec 22, the crescent moon passes them, adding to the spectacle.

Mars and Saturn in East

Our other two December planets rise in the east about midnight, and these also are very close together. They are Mars and Saturn. Of very similar brightness at present, Mars is of magnitude one, while Saturn is about five-sixths as bright. The red color of Mars, fortunately, makes it easy to identify. Mars has been to the west of Saturn, but on Nov 30 passed its fainter brother, and during December is toward the east and south, gradually drawing farther away.

Among the stars of the month, the brilliant constellation of Orion, the warrior, is most prominent, as he always is in our winter skies. To locate him, look to the southeast, for the three stars in a row that mark his belt. The two bright stars just above, of which Betelgeuse is one, mark his shoulders, while Rigel, below, is in one of his feet. As depicted in the old star maps, which showed the actual figures around the stars, he is depicted as holding an up-raised club, defending himself from the charge of Taurus, the bull. This animal forms another constellation, above and to

the right, with first magnitude Aldebaran as one of his eyes.

Stars of Month

On the other side of Orion, shown low in the east, are the two dogs, Canis Major and Canis Minor, which contain the stars Sirius and Procyon. Of all the stars we see in the night-time sky, Sirius is brightest, almost as bright as Jupiter. Actually it is not so bright as stars go, but looks so brilliant because it is one of the closest of the stars.

Alongside Orion, to the north, we can see Gemini, the twins, with the stars Castor and Pollux, the latter the more brilliant. And above them we find Auriga, the charioteer, with Capella, still another star of the first magnitude.

Calendar Erroneous

With the arrival of December, and the imminent approach of another year, the calendar comes to mind, and this time it seems to have particular significance, for the transition from the first to the second half of the 20th century is not far off. Already the letters in one national weekly have discussed candidates for the title of the "man of the first half century." Many of these correspondents doubtless think that the half century will end this month, and that Jan 1, 1950, will begin the second half. No doubt there will be much discussion of the problem, as there was in January, 1900, when many, many persons thought that the 20th century was starting.

Actually, however, 1900 was the last year of the 19th century. The 20th century began on Jan 1, 1901, and the second

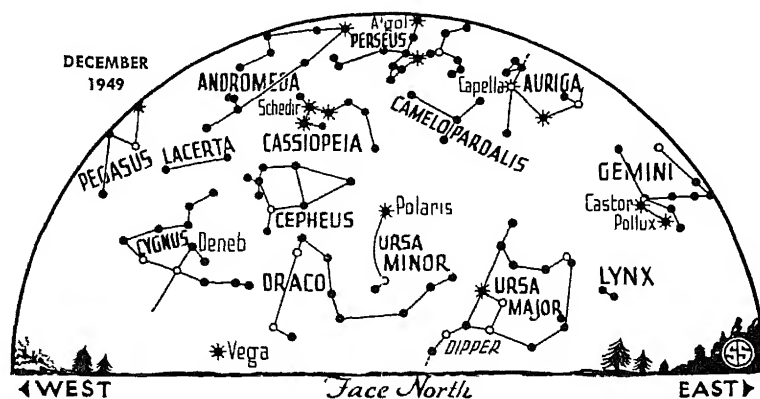
half of that century will begin Jan 1, 1951. This is readily apparent when we consider the beginning of the Christian era, which we use in our reckoning, and the fact that it takes 100 years to make a century, just as it takes 100 cents to make a dollar.

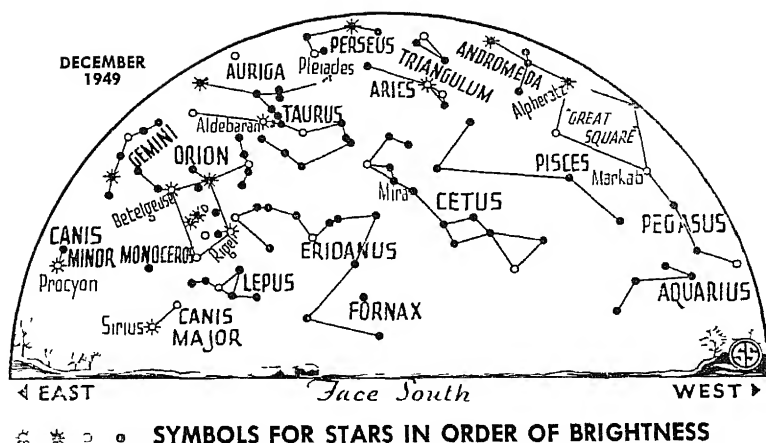
If you are saving money, a cent at a time, your first penny starts your first dollar. When you have 99 pennies, however, you do not have a dollar, but that is completed with the hundredth. Penny number 101 starts your second dollar, which is completed when you have a total of 200. With 1,899 pennies you are one cent short of \$19.00, for 1,900 are needed to make that amount, and the 1,901st penny starts your twentieth dollar.

Exactly the same reasoning may be applied to the years. The year 1 A D was the first of the first century, which was completed at the end of the year 100 A D. The second century began with 101, the third with 201, and so on, until 1901, which began the 20th century. Since 1950 completes 50 years, which is a half century, the second half of the present century begins on Jan 1, 1951, and will end on Dec 31, 2000.

Although we use the term "anno domini," or "the year of our Lord," and say that this is the year 1949 by that reckoning, it is a fact that Christ was born at least 1,953 years ago. We know that He was born during the reign of King Herod, who, according to the Jewish historian Josephus, died shortly after an eclipse of the moon. The only eclipse which could fit was one that occurred March 13, 4 B C., so evidently the Nativity was earlier than that.

It was not until the early part of the sixth century that a monk named Dionysius Exiguus introduced the practice of counting years from the birth of Christ. Prior to that, in countries connected with the Roman Empire, years had been counted A U C.—"from the founding of the city," i e., of Rome. Dionysius followed a tradition that





Christ had been born in the 28th year of the reign of the Emperor Augustus, and assumed that this reign started in the Roman year 727. Adding 28 years brought him to the year 754 A U C, so Dionysius took this as 1 B C in the new reckoning, and made the following year, 755 A U C, the year 1 A D.

The monk was mistaken. It was in 727 that Augustus began his reign under that name, but he became emperor four years earlier. This was after the battle of Actium, which he, as the General Octavius, won against the armies of Antony and Cleopatra. After ruling for four years under his own name, he took the name of Augustus in 727 A U C. Though Dionysius' mistake has long been known, it would cause much confusion to correct it now, so we still continue with his system.

Time Table for December

Dec	EST	
1	1 00 a m	Moon farthest, distance 251,900 miles
3	10 48 p m	Algol, variable star in Perseus, at minimum brightness
5	10 13 a m	Full moon
6	7 37 p m	Algol at minimum
	10 00 p m	Venus passes Jupiter
12	early a m	Meteors radiating from constellation of Gemini visible
	5 56 p m	Moon passes Saturn
	8 48 p m	Moon in last quarter
13	3 43 a m	Moon passes Mars
17	2 00 a m	Moon nearest, distance 226,500 miles
19	1 55 p m	New moon
21	11 24 p m	Sun farthest south, winter commences in northern hemisphere
22	3 21 a m	Moon passes Jupiter
	6 05 p m	Moon passes Venus
24	12 32 a m	Algol at minimum
	9 00 p m	Planet Uranus nearest, distance 1,669,000,000 miles
26	10 00 a m	Venus at greatest brilliancy
27	1 31 a m	Moon in first quarter
28	7 00 p m	Moon nearest, distance 251,400 miles
29	6 10 p m	Algol at minimum

Subtract one hour for CST, two hours for MST, and three for PST

Science News Letter, November 26, 1949

ENGINEERING

Air Compressor May Be New-Type Auto Engine

➤ AN AIR compressor from a German submarine may develop into a new type of automobile or truck engine, Stanford engineers assert. From pushing torpedoes to powering cars is an easy step. Its advantage over other engines is lightness, lack of vibration and low cost.

It is described by them as a "free piston" diesel compression. It will run on low grade oil. It can take 70 cubic feet of free air a minute and compress it to 3,000 pounds per square inch of compressed air. As an engine, it would produce hot gases, roughly at a pressure of 100 pounds per square inch, and these gases would drive a turbine which in turn would drive a shaft.

Tests on this former German U-boat compressor are being made by W. H. Chamberlain, graduate student in engineering. The work is sponsored by the Office of Naval Research. It is aimed at analyzing the thermodynamic and dynamic design aspects of both the air compressor and prime mover types of free piston systems.

The free piston engine is not new. It was invented by a Frenchman named Rault de Pescara some 20 years ago. He and other scientists in France are still carrying on extensive development work. It is the recent interest in this type of engine both in France and Germany that has inspired the American study.

The design of the engine is characterized by extreme mechanical simplicity, according to Prof. A. L. London of Stanford. Theoretically the free piston diesel-turbine prime mover has a higher thermal efficiency than the modern diesel.

Science News Letter, November 26, 1949

The Soviet port of *Murmansk* on the European Arctic coast is ice-free the year round because of the American Gulf Stream, part of which passes north of Norway into the Arctic Ocean.

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ORDNANCE

Improved Subs Ahead

➤ THE submarine will become the primary instrument of naval attack in wars of the future, it was predicted by Lloyd H. Norman in *ORDNANCE* (Nov-Dec), official journal of the American Ordnance Association.

The submarine will remain after the big flattops, the battleships, the cruisers, and most other surface warships have been retired, this wartime naval officer declares. It is the cheapest and most effective naval weapon for its cost, he added, but present day submarines are still in their infancy.

Submarines of today, however, are vastly improved over the recent wartime type. The Navy is now building two new underwater vessels far superior to any now in use. They will cost about \$21,000,000 each and will include much that is new in submarine construction, including advances made by the Germans during the war. They will be equipped with improved diesel engines, but may later be adapted for a new type like the Walter engine—or atomic power if it becomes feasible.

The so-called Walter engine is a German

development which uses hydrogen peroxide. It is said to be extremely efficient, particularly for emergency speeds of 25 knots, but studies made at the Naval laboratories at Annapolis show that it is extremely uneconomical because it requires peroxide of 90% purity.

The efficient German Kreislauf engine is also being adapted for American use. It is a diesel which uses its own exhaust gases supplemented by injections of pure oxygen from oxygen tanks. This engine permits deep underwater operation without use of the schnorkel breathing device. The schnorkel is a tube which can be projected some 50 to 60 feet above a submerged boat into the atmosphere. By this means a submarine may remain under water for many days.

Twenty-four of America's wartime submarines are under conversion with schnorkel installations and other improvements. They are being streamlined by the removal of deck guns and are being given greater battery capacity.

Science News Letter, November 26, 1949

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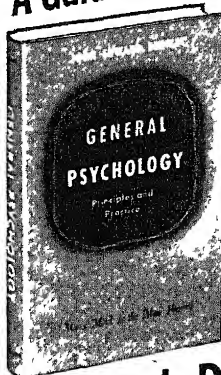
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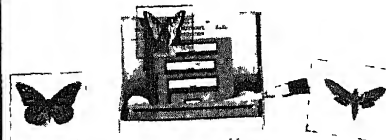
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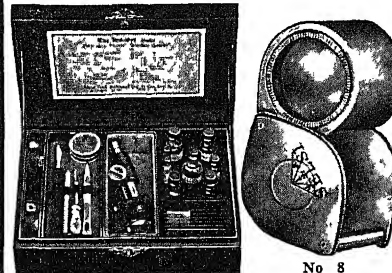
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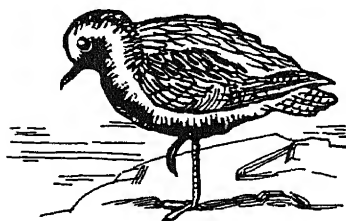
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Bird Migrations

➤ AMONG the many things that man has in common with the animals is a tendency to stay put. In some primitive human societies tribes of nomads and hunters have been known to follow the seasons in limited migrations. Some animals make similar adjustments to seasonal changes.

But the great migrations over long distances are made by birds and fishes. Both perform prodigious feats of navigation and endurance, but the more spectacular, possibly because the evidence is more readily apparent, are the seasonal comings and goings of the birds.

The lengths that birds go to to find a climate that suits their taste are simply staggering. Petrels, a kind of sea bird, nest on islands in the Antarctic region. For the winter, they fly all the way up to North America. Golden plovers raise their young on the shores of the Arctic Ocean. Before the long winter freeze sets in, they take wing for the Argentine pampas. They do not cover this tremendous distance, as you might expect, in a straight line "as the crow flies." The first leg of their journey is easterly, following the northern coastline of the continent. Not till Labrador do they

start heading south. But once pointed in the direction of their winter home, they stay on course even though this means flying over open sea for 2400 miles.

Another great traveler, probably the greatest of all, is the Arctic tern. He travels from the Arctic to the Antarctic, covering more than 20,000 miles on the round trip.

The ducks, at which thousands of Americans are blasting away from damp and chilly duck-blinds all over the country, are here for the winter from their nesting grounds in northern Canada. It is a grim commentary on the bitterness of the northern winter that the birds still prefer to risk the deadly barrage that awaits them in our milder climate.

What guides the birds on their lengthy migrations remains a mystery. The usual answer is "instinct," but that merely names the phenomenon without explaining it. There are many arguments to disprove the theory that they follow familiar landmarks. The most convincing is the fact that the last birds to leave are the young birds born that year. The older birds who have made the flight before are gone. And yet the youngsters follow the traditional flyway unerringly.

Recently the explanation has been suggested that the birds are guided by the magnetic field of the earth. This theory

has been neither proved nor disproved. It would carry more conviction if all birds flew in direct north and south lines. On the contrary, each kind of bird has its own characteristic flight path. For example, there are two kinds of palm warbler which summer in eastern and western Canada, respectively. The western type winters in the West Indies, the eastern type in the Gulf States. Their paths cross at right angles over Alabama and Georgia. It is hard to square this fact with the magnetic field theory.

Science News Letter, November 26, 1949

NUCLEAR PHYSICS

New Instrument to Detect Nuclear Rays Demonstrated

➤ NUCLEAR rays of atomic bomb fame can be detected with a new instrument demonstrated at the National Bureau of Standards to a group of scientists. The instrument has also many other applications.

It can be used by medical men to follow the course of isotopes injected into the human body and to record the output of vacuum phototubes and in the measurement of light intensities for ultraviolet or visible spectrum analysis.

The new instrument is a product of the Brown Instrument Division of Minneapolis Honeywell Regulator Company and will be known as the Brown electrometer. Walter Wills of the Brown Company stated that it can measure and record the flow of current or radiation without attendants and the maximum deviation from accuracy will never be more than 0.3 millivolts in one day.

A single instrument without any alteration has a hundred variations in currents which it will measure, by means of a range-changing switch. With mercury switch mechanisms added, signal lights or alarms can be turned on, he stated, when dangerous rays are detected or electrical current becomes too high or too low.

Science News Letter, November 26, 1949



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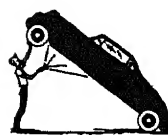
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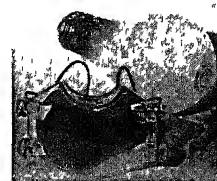
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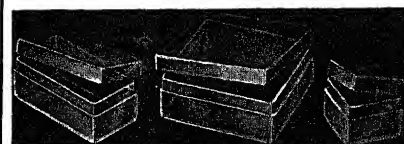
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❄️ **RUG AND UPHOLSTERY CLEANING PREPARATION**, a combination of selected and blended detergents, is said to be easy to use and unusually effective for this purpose but can be employed also to clean porcelain, painted wood and window glass. It is non-inflammable, odorless and kind to hands.

Science News Letter, November 26, 1949

❄️ **HEAT-TREATMENT APPARATUS**, to harden rail joints after railroad tracks have been laid, is a portable blowtorch affair of light weight, usable by an unskilled operator. This recently patented device maintains a proper rate of movement back and forth across the joint, with a proper pause at the end of each stroke.

Science News Letter, November 26, 1949

❄️ **CIGAR-CIGARETTE LIGHTER** for the home or office is similar to the familiar lighter used in automobiles but operates on the ordinary household electric current. Although made in various designs, these pop-up lighters are equipped with electro-mechanical chassis identical in all models.

Science News Letter, November 26, 1949

❄️ **VELON PLASTIC BEDSPREADS**, shown in the picture, have the appearance and texture of luxury fabrics but



keep their smart good looks with a minimum of care. A damp cloth will remove everyday dust and stains, even baby's spilt milk. They come in metallic colors of blue, green, rose and gray.

Science News Letter, November 26, 1949

❄️ **ANTI-CLOGGING DEVICE** for roof drains is inserted in the gutter end of the

down-pipe and provides turbine elements operated by water entering the drain. Suction ordinarily created in the drain, which draws materials against the strainer, is prevented by the turbine action in this recently patented invention.

Science News Letter, November 26, 1949

❄️ **NAIL EXTRACTOR** for automobile tires, recently patented, is a toothed device to mount on the tread of the tire in a stationary position which will intercept nails and other small bodies embedded in the rubber as the tire is rotated past it.

Science News Letter, November 26, 1949

❄️ **CLOTHES HAMPER**, that fits under the wall-attached bathroom wash basin, has adjustable sides which permits it to be easily placed under any standard fixture. Sturdily built of enameled steel, it effectively conceals drain pipes and makes use of what otherwise is waste space.

Science News Letter, November 26, 1949

❄️ **INFRA-RED HEAT LAMP**, an industrial 500-watt sealed beam affair, utilizes a new type of tungsten filament and has the inside of its bulb lined with pure polished silver that acts as a built-in reflector. A protective supporting structure for the filament is a type never before used in heat lamps.

Science News Letter, November 26, 1949

• Do You Know? •

Some 5,500 automotive patents will probably be issued this year.

Bacteria need their vitamins just as humans do; capitalizing on this fact, scientists are using microscopic life to measure the vitamin content of food.

The witch hazel shrub waits in the autumn until its leaves have turned a golden yellow before it bursts out with its stemless clusters of yellow flowers.

Gypsum plaster, with the mineral vermiculite instead of sand as an aggregate or filler, is claimed to give two to four times the fire protection provided by ordinary sand plaster.

Flavoring foods is the best-known use of common salt but far greater quantities are used in the manufacture of chemicals, explosives, paper, fertilizers, soap, steel, glass dye setting, water softeners and for thawing ice.

Modern farm management includes border planting of trees, shrubs and lespedeza grass for the benefit of wildlife as well as to prevent erosion and serve as a windbreak, some wildlife yields fur, others destroy insect pests.

Natural gas and petroleum are often found in the same underground deposits because both originated, it is believed, in past geological ages from marine organisms which were buried in the muds in ocean bottoms.

The largest salt mine in the world is believed to be one in New York State that produces some 4,000 tons daily in a single shift; in the past 20 years it has yielded over 12,000,000 tons of salt.

Norway will have 119 whaling vessels and 10 processing ships in the Antarctic during the present whaling season; one factory boat will can whale meat, liver paste and other whale products as well as processing the oil.

Vermiculite, coming more widely into use in lightweight concrete and plaster, is an aluminum-iron-magnesium-silicate mineral, heavy as found in nature but which expands permanently about 15 times in volume under heat-treatment.

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DECEMBER 3, 1949

DECEMBER 3, 1949

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PSYCHIATRY

New Theory of Complexes

➤ PEOPLE with inferiority complexes also have superiority complexes. The two go together, like the two sides of a coin. The superiority is not put on to make up for feelings of inferiority, as most people believe.

This view, differing from that of earlier psychiatrists, is presented by Dr. Harrington V. Ingham of the Student Health Service, University of California at Los Angeles.

The neurotic benefits from both complexes. If he assumes the superior attitude, he gets praise and does not have to prove himself worthy of it in competition, which he dreads. If he assumes the inferior attitude, he does not have to compete, because everyone knows he will fail and gives him sympathy without his having to compete.

An example of double attitude, given by Dr. Ingham in a report to the California Medical Society in CALIFORNIA MEDICINE (Nov.), is the case of Miss A., "an attractive young woman of 20 who has difficulty in her relationship to the opposite sex."

She complained of feeling repulsive to men and had actually been unable to please them. She made herself unattractive in clothes, voice, choice of words, mannerisms and over eagerness. At the same time she denied that she did this.

Later, it came out that she also felt herself so fascinating that she stayed away from men so as not to hurt them. She had to be careful to avoid being a siren.

Also she was afraid of flirting because it

might fail "and prove her devastating powers non-existent."

"She could still hope her inferiority was unreal if it were not put to the test," Dr. Ingham pointed out. "She could no more tolerate success than failure."

Improvement in her case involved discussion of both her extremes of opinion. When one was discussed, she would bring up the other. But she finally was able to get a more realistic view of herself after which she improved and her behavior changed.

The inferiority-superiority complex occurs, Dr. Ingham stated, in persons who "cannot meet their world face to face, because they have not found sufficient gratification."

A child's opinion of himself is derived from his mother's and father's attitude toward him. The child whose parents show him a lot of affection is not likely to have a double, superior-inferior feeling about himself because he has had gratification and can meet his world face to face.

But a child who is constantly praised by one parent and criticized by the other gets so much contradictory information about himself that he may well be unable to know his true worth. Similarly, a child with foreign parents who finds standards in his home very different from elsewhere may become confused. Confused and uncertain, the child may well develop superiority and inferiority complexes instead of arriving at a real appraisal of himself and his abilities.

Science News Letter, December 3, 1949

PSYCHIATRY

All Posture Has Meaning

➤ EVERY little posture has a meaning all its own—to the psychoanalyst.

How a patient on the analyst's couch moves and holds his hands, fingers, arms, and legs, whether he crosses his left leg over his right or the reverse, and whether he tucks his thumb inside his fist all may give clues to understanding of his unconscious motivations.

Results of a five-year study of "how the body speaks" were reported by Dr. Felix Deutsch of Boston at the New York Academy of Sciences in New York.

"Every person has a basic posture," he stated.

"Every posture is meaningful and consists of a combination of well-determined postures of single parts. All postures of different parts of the body are attuned to each other and the change of one partial posture leads to a rearrangement of the total configuration."

One patient, Dr. Deutsch said, through

three years of psychoanalysis, assumed a strange hand posture, building with her fingers "the prettiest architectonic edifices," until she became conscious that these fingers represented family members, two sisters, father, mother and brother, whom she led through movements like puppets in a show. Her aggressive, destructive and hostile feelings as well as friendly ones toward them were acted out in continually changing positions of the fingers of both hands.

Another example was a woman with strong masculine tendencies. Unconscious fantasy led her always to place her right hand on top of her left, until the second year of analysis when feminine tendencies broke through and her left hand was then put on top of her right.

A four-year-old, prematurely born, blind boy who could not talk and could stand only with difficulty was another patient. He made rhythmic pounding movements

of his left hand against the wall and against his own head. In spells of crying out loud he suddenly turned in a protective attitude with his right hand toward his right ear while the left hand tried to attack and tear this ear.

"It seemed," Dr. Deutsch said, "as if the right hand had taken over the protective defensive attitude whereas the left hand played the destructive aggressive role. The boy, who had been frustrated in his relationships toward the outer world, and had been deprived of the love of his mother who rejected him, used his hands on his own body for acting out his ambivalent (for and against) feelings in assigning the positive feelings to the right hand and the negative feelings to the left hand."

Science News Letter, December 3, 1949

AGRONOMY

Sagebrush Can Be Licked by 2,4-D

➤ THERE'S moonlight on the sage tonight. And there is a good chance there will be 2,4-D on it also.

But the sentimental need not despair, for when the weed-killer has done its work and the sagebrush is gone, it will be replaced by love grass, little bluestem, and other grasses.

This came to light when the U. S. Southern Great Plains Field Station put on a demonstration of the effectiveness of 2,4-D in eradicating sagebrush, which for stockmen and ranchers is an expensive weed pest.

Spraying the chemical from airplanes, at a cost of \$2.25 per acre, station scientists found that they killed up to 90% of the sagebrush plants. They then planted a variety of tall native grasses, sand love grass, little bluestem, sand bluestem, switchgrass and Indian grass. Profits from range treated in this way have been double those from sage-infested pasture, figures over a seven-year period indicate.

Science News Letter, December 3, 1949

ASTRONOMY

Sixth Comet, 1949F, Is Fast-Moving

➤ THE year's sixth comet, 1949-F, is a fast-moving one. This first important discovery of the sky survey being made at Palomar Observatory was first observed in the constellation of Pegasus, moved speedily into Pisces, and was reported on its way to another constellation.

The comet was discovered by Dr. A. G. Wilson, astronomer in charge of the sky survey. It is a sixteenth magnitude comet, not visible to the naked eye, and is moving away from the sun and east and north.

Science News Letter, December 3, 1949

ENTOMOLOGY

Mosquitoes Resist DDT

DDT has lost its effectiveness against two salt marsh mosquitoes. Malaria-carrying mosquitoes may be the next to develop resistance to the chemical.

➤ DDT, a chemical which did a valiant job during the war in protecting our forces from disease-carrying pests, is beginning to lose its effectiveness.

Two kinds of salt marsh mosquitoes have now developed resistance to the chemical. Malaria-carrying mosquitoes may be next. The two salt marsh mosquitoes have been serious pests along the Atlantic and Gulf coasts, making many areas impossible for people to live in during the mosquito season. One of them, *Aedes sollicitans*, may spread equine encephalomyelitis, so-called horse sleeping sickness which can also attack man. The other, *Aedes taeniorhynchus*, spreads dengue fever in Florida.

Malaria-carrying mosquitoes have so far not been found resistant to DDT. But entomologists, the scientists who specialize in study of insects, think it is only a matter of time before the malaria mosquitoes will also develop resistance to DDT.

Chemicals which may take over when DDT fails are already being tested by scientists of the U. S. Department of Agriculture. One of them, Lindane, has shown great promise, but is still expensive. It is known to scientists as the gamma isomer of benzene hexachloride. Others have been tried and are also effective. But agriculture scientists feel that more tests of these new insecticidal chemicals must be made before they can recommend any particular one or ones.

Discovery of the DDT-resistant mosquitoes was made in areas along the east coast of Florida by Department of Agriculture scientists working in cooperation with the Department of Defense and the Brevard County Mosquito Control District. First word that DDT resistance was developing, in mosquitoes near Cocoa, Fla., came from the U. S. Air Force Salt marshes in that area had been treated with DDT in oil at regular and frequent intervals for five years. This had kept the area free from mosquitoes, which was considered one of the miracles of present day insect control practices.

Then, during 1949, great flights of mosquitoes from the treated areas swarmed into nearby towns and villages, in spite of heavy applications of DDT. Help was requested from the Department of Agriculture entomologists stationed at nearby Orlando, Fla. It was at this laboratory that much of the work was done during the war on the development of DDT for control of dangerous insect pests.

Both adults and larvae of both species of salt marsh mosquitoes in the Banana

River area of Florida have now developed resistance to DDT, Dr. W. V. King and associates report from their studies.

Heretofore, the larvae, or wriggler, killing power of DDT had been one of its most remarkable features. But now 10 times the amount previously effective does not kill the resistant larvae.

Only adult house flies have previously developed such resistance to DDT.

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ANTHROPOLOGY

Thumb Bone of Ape Man Is New Clue to Problem

➤ DISCOVERY of a thumb bone of the large Swartkrans ape-man, which gives scientists a new clue for solving the missing link problem, is announced by Drs. R. Broom and J. T. Robinson, of the Transvaal Museum, Pretoria, South Africa.

"One of the most noteworthy differences

between man and the higher anthropoids (apes) is that while man has a good opposable thumb, in the anthropoid the thumb is somewhat degenerate," the scientists point out in their report to the scientific journal, *NATURE* (Nov. 12).

The "opposable thumb" makes it possible for man to manipulate tools and weapons, though some anthropologists believe that the brain behind the thumb may be what makes us better able to use our hands than chimpanzees and other apes can.

The thumb bone now discovered in South Africa is the metacarpal, which is the first bone starting from the wrist.

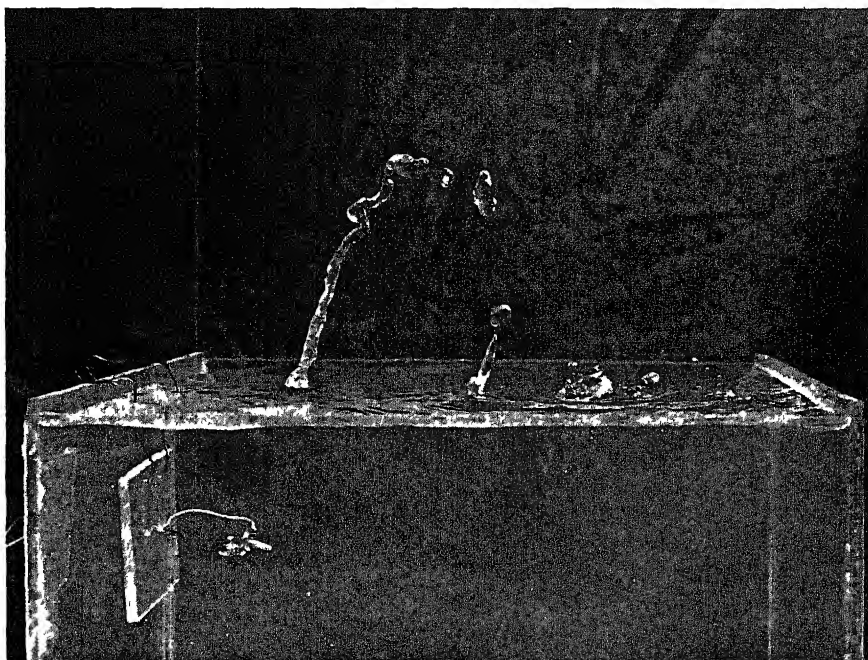
"It is almost exactly like that of man, but smaller," the scientists report.

It is shorter than the Bushman's thumb metacarpal but is somewhat stouter and a little more curved than in man. The fingers of the Swartkrans ape-man probably also were shorter than man's, the scientists suggest, so that the thumb being shorter is not surprising.

The one important difference between this newly-discovered ape-man's thumb bone and man's is a distinct pointed bony process on the inner side at the distal end. The scientists have seen nothing like this in man's thumb bone.

"It seems likely," they conclude, "that the thumb, though a little shorter than in man, was a useful clasping organ, and able to manipulate tools and weapons."

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ULTRASONIC WAVES—Sound waves with a frequency of nearly 3,000,000 cycles per second, cause this snake-like jet of water, which breaks up a few inches above the tank, to spurt from the water tank. The ultrasonic waves, sounds pitched so high as to be inaudible, come from a small disc in the water, clamped between two wires. The concave disc vibrates when a voltage is applied across it, and the sound waves are focused upward, causing the geyser.

VETERINARY MEDICINE

Virus Threatens Porkers

➤ A SERIOUS potential threat to the nation's \$2 billion pig industry was revealed in Washington, D. C., with the announcement of a hitherto unrecognized hog-cholera virus which causes outbreaks shortly after injection of the standard anti-serum.

The U. S. Bureau of Animal Industry identified the variant virus when it checked on post-treatment outbreaks which occurred this summer in Iowa, Nebraska and Minnesota.

It is believed that the variant virus was introduced into affected herds as part of the cholera-anti-cholera treatment, when the variant instead of the standard virus was unknowingly injected. A small quantity of the standard virus is injected at the time of serum inoculation to make the immunity permanent.

Until this announcement, only one hog-cholera virus was recognized. Government scientists stress the point that if standard virus is used in the treatment, immunity

is completely effective against both forms of the disease.

Hog-cholera, which is spread by flies and possibly other insects and birds, strikes suddenly, wiping out whole herds in a short time. Ever since it was recognized as a virus disease early in the century, it has been kept under close control, although there was a serious outbreak in 1926, due largely to inadequate supplies of serum.

In a single year losses have run as high as \$65,000,000. Hog-cholera is one of the first diseases to be studied by the Department of Agriculture, having been investigated as early as 1878. The policy has been one of control, not eradication.

In the absence of exact figures, present losses from hog-cholera are estimated to be about 20 to 30 pigs per thousand. The 1948 hog population was 55,038,000, estimated to be worth \$2,355,609,000.

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But they found more destruction, particularly to the central nervous system, than previous work indicated. It was noteworthy that animals exposed to repeated episodes of deficiency showed damage in the brain centers known as the basal ganglia and other tissue which in man are often involved in Parkinson's Disease.

No neuritis was found in the thiamine deficient monkeys, confirming recent work which indicates that this condition is the result of a multiple deficiency.

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MEDICINE

Vitamin B₁ Lack Harmful

➤ A VITAMIN B₁ deficiency apparently will do more harm to the central nervous system than scientists have thought it would.

This is reported by Dr. James Rinehart, professor of pathology at the University of California Medical School in the Archives of Pathology (Aug.).

Dr. Rinehart and his associates, Dr. Louis D. Greenberg and Melvin Friedman, are in the midst of a study of the effects of vitamin B deficiencies in the monkey.

Nearly all past studies of vitamin B₁ deficiency have been done on lower animals, particularly rats. So Dr. Rinehart wanted

to find out just what the deficiency would do to an animal which more closely resembles man physiologically.

Precise studies of such deficiencies in monkeys have become possible only recently, with the development of a reliable synthetic diet for these animals. By withdrawing a single nutritional factor from this diet, scientists can determine the effects of its withdrawal.

Dr. Rinehart and his colleagues confirmed previous findings with lower animals including damage to the central nervous system, the heart and interference with red blood cell manufacture.

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ENTOMOLOGY

Against what have two salt marsh mosquitoes developed resistance? p. 355.

GENETICS

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ENGINEERING

What is the function of the BEMAC? p. 357.

Photographs: Cover, Boeing Airplane Company; p. 355, General Electric; p. 357, Boeing Airplane Company; p. 359, U. S. Fish and Wildlife Service; p. 363, American Museum of Natural History; p. 368, Corps of Engineers, Department of Army.

MEDICINE

What part of the body is harmed by the lack of Vitamin B₁? p. 356.

What are the latest results of treating colds with anti-cold pills? p. 359.

PSYCHIATRY

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Why are postures meaningful? p. 354.

VETERINARY MEDICINE

What is the threat to porkers? p. 356.

ENGINEERING

"Brain" Missile Recorder

The new "brain" will predict and record every movement that a giant missile would make without shooting the missile into the air. Use of it will cut field experiment costs.

➤ ANOTHER giant computing machine of the electronic type, was revealed by the Boeing Airplane Company, Seattle, Wash. It will study probable flight of a wartime missile. Scientists call such a machine an analogue computer and it is somewhat similar to the digital "electronic brains" of the ENIAC, BINAC or MARK III types.

This new Boeing "brain" will predict and record every movement that a giant missile would make in the air from take-off to landing without even shooting the missile into the air. It will record every waver, dip and spiral the bomb would take if actually fired, and not only is the landing recorded, but also the where and when of the landing.

BEMAC is the name selected for the new device. It does not completely out-mode the traditional gathering of information by actual test flights of missiles, but its use for numerous problems will save many thousands of dollars in time and material required in field experimentation.

It was designed for use in conjunction with Boeing's GAPA ground-to-air pilotless missile project for the U. S. Air Force. The computer was developed by George Stoner, Robert Illman, Bill Galloway, Carl Crumb and Douglas Wilson, all of the Boeing Physical Research unit.

The record of the imaginary flight of a particular missile is made with a rapid-acting motion picture camera which photographs a moving series of dots on the screen or oscilloscope of the computer. The computations are recorded in such a manner that they actually look like a missile flight in the viewer, or in the permanent record of the visual scope made by the camera.

It takes a human "electronic" brain to understand the workings of these mechanical computers, often called "electronic brains," but which are not brains at all. They do no thinking. With the use of many hundreds of electronic tubes and special mechanisms, they follow instructions fed into them in code to find the answers of problems, also fed into them in code, which may be mathematical or physical. The BEMAC is fundamentally non-arithmetic.

A missile is capable of doing only a limited number of basic things in flight, Boeing engineers explain. It can pitch, so an integrator in the electronic portion of the computer is assigned the missile's pitch characteristics through analogous alternating current voltages. These voltages are based on law-of-motion formulas. Each of

the other changes of motion, of which the missile is capable, such as roll, yaw and acceleration, is similarly assigned to different integrators. The sum of all these possible motions represents the missile itself.

At this point BEMAC simulates only the motionless missile, these scientists continue. If a missile were in motion, the original propelling force would set all these inter-

related movements into action. A control surface deflection might cause some yaw and pitch and some change in the angle of flight. The combination of these changes might alter such variables as its velocity and slant range.

In the simulated system, each integrator is connected with each other integrator in much the same manner as the nerve systems in the human body. A change in the yaw integrator thus will be transmitted to the pitch integrator and to all the other integrators for simultaneous reaction. The machine starts to operate with conditions corresponding to those at some known point in a missile flight. Then, as time passes, the analogues will go through the same variations as the corresponding problem variables.

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MATHEMATICS

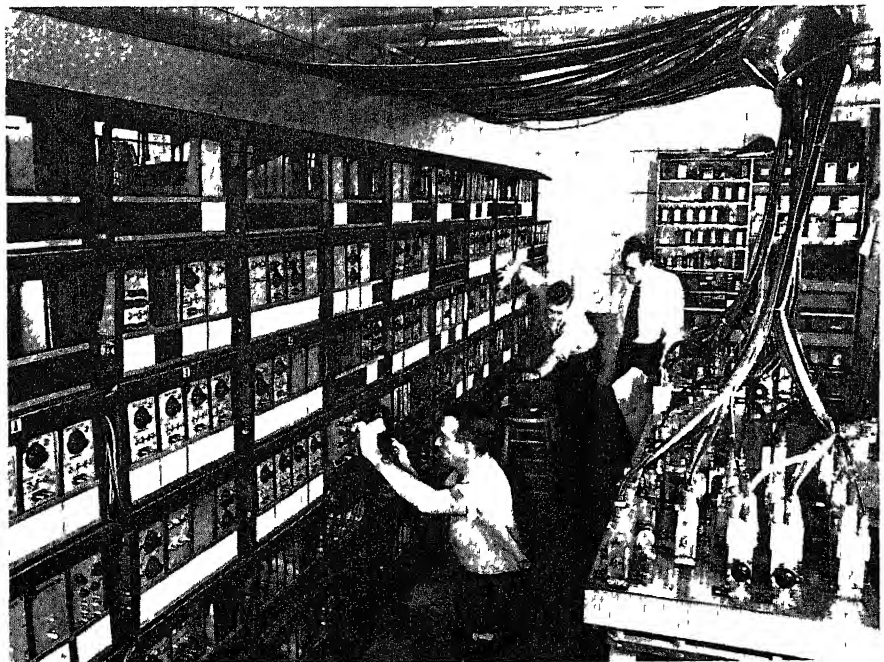
Gambling Luck No Myth

➤ GAMBLERS' lucky streaks are more than just a superstition among the sporting crowd, the latest work of hard-headed mathematicians discloses.

Studies of the simple gambling game of coin-tossing have shown that even when the coin is perfectly "fair", with equal chances for heads and tails, it is most likely that one of the players will lead in an overwhelming large proportion of the time. The chances that each player will lead

about half the time are much smaller.

Whether or not these new results can be used for a "system" of winning was not announced by mathematicians Kai Lai Chung and W. Feller of Cornell University, Ithaca, N. Y., in their paper in the PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES (Oct.). They did give an example of how extreme is the possibility of runs by stating that if a coin is tossed once a second for a total of 365 days, the probability that one of the players will lead for more



BEMAC COMPUTER—The entire computing portion of the BEMAC appears above with electronic components at left and mechanical section at right. Both sections are set up in "building block" fashion so that two or more relatively simple problems can be worked simultaneously.

than 364 days and 10 hours is one in 20

Thus, if you are losing, the chances are against you if you stick it out and wait for your bad luck to change, because it is quite unlikely that you will be ahead half the time in the long run. On the other hand, these mathematicians predict that if you quit when you are even, the chances are only one in 5,000 that you will be faced with such a long run of bad luck.

Help to gamblers is not the goal of the

studies of coin tossing by mathematicians Chung and Feller, however. A better knowledge of probability theory, such as may be learned from simple coin-flipping problems, is expected to lead to better communication and radio equipment and to other engineering advances, and these hopes are the reason for the support of the study at Cornell University by the Office of Naval Research.

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PSYCHOLOGY

Miners Dislike Mining

➤ MINERS would much rather be farmers, carpenters or machinists than miners. This probably is one of the underlying psychological reasons for repeated strikes in the coal industry, two University of Illinois psychologists report from their intensive study of one typical mining community in Illinois.

Dangers and unhealthy conditions on the job were the reasons given by the men for their deep dissatisfaction with their jobs, when Drs. James Francis Kelly and Thomas W. Harrell interviewed 50 representative miners.

More than half of the men think that miners' wages are high enough, it was found, although 31% feel that the pay is not in line with the difficulties and danger of the occupation. And others qualified their opinions by saying that their pay was not enough for old age, these men feel that the welfare fund is a big help.

The men are not irreconcilably antagonistic to management. Thirty-five out of the 50 interviewed said they believe mine

management is fair.

Nine men out of every ten—45 of the 50 interviewed—said that if they had their lives to live over again they would never be miners. Only four said they would pick mining as a job. Two of the four who would go into it again said they liked the high pay.

The miners are pretty solidly behind John L. Lewis and the United Mine Workers of America. Sixty-four per cent had nothing but praise. Another 24% praised him but qualified their praise with some criticism. With only six men did the blame outweigh the criticism.

Lewis was praised most for his strength and for what he had gained for the men. He was criticized for his personal ambition and dabbling in politics and his ironclad control of the union. Two men said he is too old.

No one criticized the United Mine Workers of America.

Full details of the survey are reported in PERSONNEL PSYCHOLOGY.

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CHEMISTRY

Fire-Retardant Coatings

➤ PAINT can be made to retard fire instead of causing it to spread, thanks to new chemical and paint research of the past few years. While fire-retardant paint if used on the ill-fated Noronic would not have been the whole answer to preventing the fire, it was the opinion of chemists at the American Chemical Society meeting in Atlantic City, N. J., that it might have helped materially.

Widely used is a Harvard war development, a urea plastic-cellulose mixture, that in effect creates a puffed up coating, like a burned marshmallow, under the effect of heat. The swelling of this glow-proof coating creates air spaces that insulate the wood beneath from the heat that might make it burst into flame faster. Ammonium phosphate, also used to flame-proof fabrics, stops the coating from burning and finely divided carbon takes up flammable gases that are generated by heat in the wood beneath. Called commercially Albr-R, it also contains titanium pigments.

Another fire-retardant coating used by the Navy is a combination of antimony oxide and a chlorinated hydrocarbon, such as paraffin or rubber. This glazes over under heat and the bulkhead of one ship bay would be prevented by it from conducting the heat of a bomb burst to the next section of the ship and setting it afire.

Another fire-retardant coating just now being tested, almost fights fire with fire, since it contains glycerine and nitroglycerine. It, too, forms a retardant coating. Cement paints were developed in England for fireproofing.

There are many successful methods of treating blankets, drapes, clothing and other fabrics to lessen the danger of a match or cigarette setting them aflame, and such flame-proofing properly applied, would prevent many destructive fires and save many lives.

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ECONOMICS

Lower Food Prices Are Predicted for Next Year

➤ MORE food at lower prices is predicted next year for the world as a whole. But population changes and unequal benefits will offset much of the gains.

This 1950-51 food prospect and the caution not to interpret it too optimistically, were laid before delegates to the Food and Agricultural Organization's fifth annual conference by FAO Director-General N. E. Dodd and his staff.

North America, Europe and the U. S. S. R. will show the largest food production gains according to present development plans. Rice supplies in Southeast Asia are expected to be more plentiful than now. India, Poland and Mexico are cited as notable examples of countries which are striving energetically to make food production outstrip population growth.

But things do not look quite so good in the large underdeveloped areas, say the FAO experts in their survey report to the delegates. Lack of money, equipment and knowhow prevent food stocks from increasing in these areas. To keep ahead of the ever-growing population, it would be necessary to raise from two to three and a half percent more food each year. There is no present plan, say the FAO experts, even to approach such an increase.

The United States and Canada in the last 10 years have become more and more important as food suppliers to other countries. Ten years ago they furnished one-seventh of all world food exports. Today their share is two-fifths. Much of this great gain arose from the war emergency when these two countries stepped up farm production enormously to supply their allies.

This has already led to surpluses in the United States. The FAO notes that steps have been taken to restrict wheat acreage in the United States, and are contemplated for corn and cotton, despite the fact that there is still a shortage of these commodities elsewhere in the world.

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On This Week's Cover

➤ THE new Boeing B-50D Superfortress is now equipped with two huge 700-gallon streamlined external fuel tanks, as shown on the outside of the wing in the picture, which can also accommodate 4,000 pound bombs (See SNL, Nov. 19). The big bomber has a speed of more than 400 miles an hour and a total bomb capacity of 28,000 pounds. The B-29 and the new B-50 Superfortresses now form the backbone of all U. S. Air Force medium bombardment and strategic reconnaissance squadrons.

Science News Letter, December 3, 1949

MEDICINE

Cold Pill Results

"Excellent results" have been reported in preventing and treating common colds with the anti-cold pill, Anahist. In these tests Neohetramine caused no unpleasant reactions.

➤ **LATEST** from the cold front Report of a scientific trial of one of the new anti-cold pills states that this pill gave "excellent results" both in preventing and treating the common cold.

This report gives your doctor his first chance to read the scientific evidence on one brand of the pills which are now being sold at drug stores without a doctor's prescription.

These particular anti-cold pills are sold under the name of Anahist. They are chemically the same as Neohetramine, an anti-histamine chemical used for treatment of hay fever and other allergies. The trials of them that gave "excellent results" are reported in *INDUSTRIAL MEDICINE* (Dec 1), by Dr. Charles C. Sweet, medical director of Sing Sing Prison, and his consultant on allergy, Dr. Joseph J. Arminio of Ossining, N. Y.

The tests were made at Sing Sing and

at a convent and a seminary. At the convent and seminary the pills were given, in different sized doses, every day from late October, 1948, to the middle of April, 1949. Of 100 persons getting 50 mg. three times a day, eight persons came down with colds during the 180-day period of the test. Only one of these was what the physicians call a third phase cold, the kind in which there is a heavy purulent discharge from the nose and which lasts four to seven days.

Among 100 getting the 50 mg. dose twice a day, which adds up to four a day of the 25 mg. pills on the market, there were 10 colds, three of the third phase type. Of 100 getting 50 mg. once a day there were 17 who got colds, 12 the third phase type.

Of 300 who got substitute pills that looked just like the cold pills, 241 got one or more colds, some as many as five

or six during the 180-day period. More than half of these, 179, were third phase type. Complications such as pneumonitis, bronchitis, sinusitis, and the like developed in 11 of these.

None of the persons getting the pills knew which were the drug and which were the dummy pills. Since members of the two groups lived and ate under the same conditions, some sleeping in the same dormitories, their chances of getting colds were considered about equal.

At Sing Sing, the cold pills were given to every third person coming for treatment. The second of each three persons got a dummy pill and the third was given whatever he usually took for a cold, such as aspirin, nose drops, and the like.

Of 40 who got the cold pills during the first 24 hours the cold lasted an average of 1.2 days, about one-fifth the time the cold lasted in those getting the dummy pills. Of 40 who got the pills within the second 24 hours of development of a cold, the time for complete relief was cut in half of the time for those on the dummy pills. Those getting the pills more than 48 hours after the start of the cold and those getting aspirin instead of the cold pills had colds lasting the usual length of time, about five days.

Besides these results of the cold pills in preventing or quickly stopping colds, the two physicians report that the drug, Neohetramine, did not cause dangerous or unpleasant reactions when given in doses of 100 mg. daily. None of the persons getting this dosage for 180 days were bothered by sleepiness, dizziness, digestive or other distress.

Science News Letter, December 3, 1949

AGRICULTURE

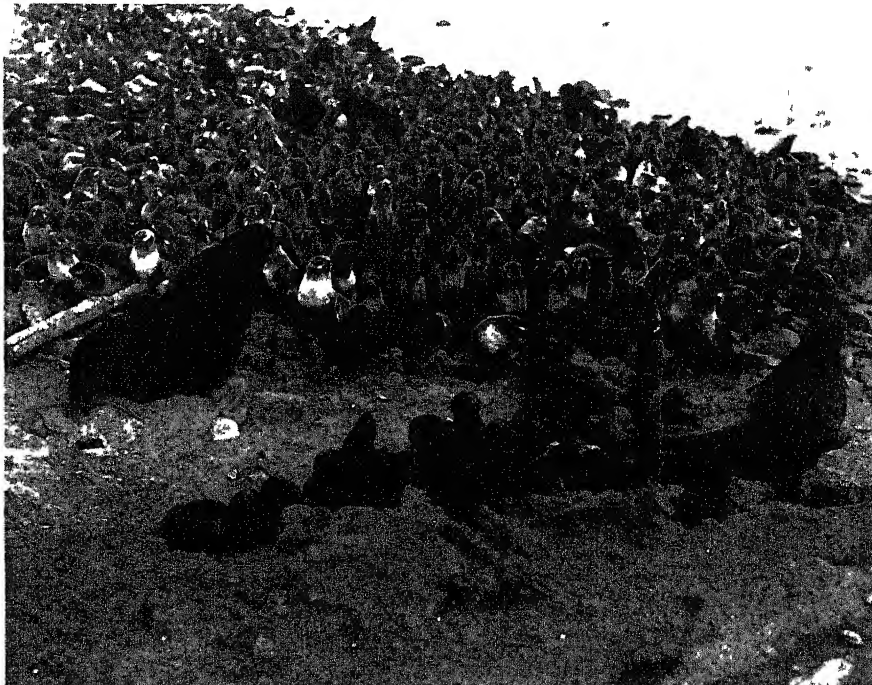
Rats Plant Seed of Range Land Weed

➤ **UNWANTED** seed planted by rats is the latest headache of ranchers in the Southwest.

The planters are Merriam kangaroo rats and the unasked-for crop is mesquite shrub. Mesquite, says the U. S. Department of Agriculture, competes with range grass. Fewer cattle and sheep can be carried on range overrun with mesquite.

Merriam kangaroo rats are a type of desert rat found in the dry regions of the Southwest. They are very fond of mesquite seed, storing them in much the manner of squirrels. They dig a shallow hole in which they bury several seeds. To make germination easier for the hard-shelled seed, the rats gnaw at them just enough to insure sprouting of most of the seeds. This precaution parallels the most progressive agricultural practice, in which machines are used to "scarify" seeds of sweetclover and other hard-shelled seed.

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FUR COATS "EN MASSE"—Seals sun on the beaches of the Pribilof Islands completely unaware of the role they will later play in enhancing milady's wardrobe. Eighty percent of all existing fur seals in the world today make their summer homes on the Pribilofs. The close relationship of the natives to the management of the valuable fur seal resources allows the natives to enjoy an economic security on par with the highest income group of any native people in all Alaska, according to a recent survey conducted by the Department of Interior.

ENTOMOLOGY

Locusts Used Automatic Stabilizer Before Planes

➤ LOCUSTS invented and used an automatic stabilizer that keeps them flying into the wind, and this insect did this long before the airplane was invented

Dr T Weis-Fogh, a Danish scientist, has announced in the British journal, *NATURE* (Nov. 19), the discovery of this aerodynamic sense organ in the kind of insect which caused plagues noted in the Bible. The locust's "yaw-stabilizer" consists of hairs on the front and top of the insect's head.

If you shoot a jet of air at a locust, it will turn and fly into the wind.

Experiments by Dr Weis-Fogh in Prof August Krogh's laboratory at Oerthefte, Denmark, showed that patches of sensory hairs ranged around the front and sides of the insect's head not only keep it headed into the wind but also stimulates the movement of the wings. As long as the jet of air is directed at the insect, it beats its wings. As soon as the jet stops, wing movement stops. In this way the insect can remain in one place in "stationary flight" for at least an hour.

By means of these hairs the insect changes direction as wind direction changes. When the experimental air jet was turned from in front of the locust to the side, the insect immediately turned head-on into the jet.

The hairs are linked with a sensory nerve whose function was not understood till now. It is not yet known whether the hairs exert any control of the insect's up and down movements also.

Science News Letter, December 3, 1949

MEDICINE

Buerger Disease Victims Are Aided by Insulin

➤ IMPRESSIVE improvement in 20 consecutive cases of the blood vessel and circulatory ailment, Buerger's disease, by treatment with insulin is reported by Dr Henryk Mazanek of Warsaw, Poland, in the *LANCET* (Nov. 19), English medical journal.

The patients were given 50 to 100 units of insulin twice daily for 20 days. The abnormally low blood sugar that resulted was corrected after three hours with a sweetened drink and a meal of sweet and starchy foods. A 10-day interval without treatment followed each 20-day course of the insulin treatment.

Response to the treatment was slow but usually appeared during or after the first course of treatment. Improvement of collateral circulation, in blood vessels unaffected by the disease but supplying the same body tissues, was marked.

Marked relief of pain, warmer, more normally colored skin, markedly improved

ability to walk and almost normal finger movement occurred. Hand grip was stronger, ulcers healed rapidly and the general condition of the patients improved, Dr Mazanek reports.

The improvement has been maintained up to the present, 14 months since it started.

Use of this treatment for Buerger's disease is a revival of overlooked work of French doctors 20 years ago.

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MEDICINE

"Chip Off the Old Block" Is True of Baby's Colic

➤ WHEN Grandma predicts that the new baby will be colicky just like his dad, or mother as the case may be, she is probably right.

Such predictions can often be made from a careful study of the family past history, Dr W Ambrose McGee of Richmond, Va, declared at the meeting of the Southern Medical Association, Cincinnati, Ohio.

Colic is a symptom of allergy, Dr McGee explained. If one or both parents had colic in early infancy or if they now have clinical allergy, especially the hay fever, asthma or digestive types, the baby "is an excellent candidate" for colic.

An earlier symptom of the allergy than colic is hiccoughing by the baby before it is born. At least half of the babies he attended who had hiccoughs while still in their mothers' wombs had colic later due to sensitivity to cow's milk.

When a baby gets colicky on breast milk, the trouble can usually be relieved by having the mother avoid some specific foods, though it takes careful questioning to discover the trouble-causing foods in the mother's diet.

The big problem is with cow's milk. Boiled, evaporated and powdered milks contain one of the milk proteins, lactalbumin, in denatured form, so that it will not cause allergic trouble. But the casein of the milk may. So other formulas with milk preparations or milk substitutes must be tried. A vegetable milk, called Mull-Soy, was suggested for such cases by Dr McGee.

"This is the only form of vegetable protein that will sustain life indefinitely aided by vitamin C," he stated.

Sometimes all milk formulas and substitutes must be abandoned and strained meats fed instead. In such cases fats, such as olive oil, and sugar and calcium must be added.

Grandma's remedies for colic, such as hot water bottles, warm water by nursing bottle or by enema and whiskey "are still of value," Dr McGee said, in attempting to relieve colicky symptoms. He also advised atropin and such modern remedies as the sleeping medicine, phenobarbital, and synthetic opium-like drugs as Demerol.

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ENGINEERING-MEDICINE

GI's Can Swiftly Assemble Portable X-Ray Machine

➤ PORTABLE X-ray equipment designed especially for rugged field use can now be put up at an instant's notice by soldiers in the field.

This was demonstrated at the National Naval Medical Center, Bethesda, Md. There are two of these light-weight "knock-down" X-ray machines. One is made primarily of sheet steel and the other primarily of sheet aluminum, in case the supply of either metal should become tight during the war.

Both machines incorporate most of the advanced and special features required to make a thorough diagnosis, such as a filter which moves back and forth during exposure to prevent scattered radiation which fogs X-ray films.

The different parts of the unit when packed in a special watertight, rigid corrugated sheet metal container, weighing about 500 pounds, will float.

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MEDICINE

"Dwarf" Bacteria Develop From Common Bacteria

➤ "DWARF" bacteria, or germs in lay man's terms, develop from some common bacteria after treatment with penicillin, Dr Robert Tulasne, of the University of Strasbourg, France, School of Medicine, has discovered.

Their place in the disease and epidemic picture may be important, he suggests.

These dwarf bacteria are too small to be seen under the microscope and small enough to pass through fine-pored filters. They may, Dr Tulasne suggests in a report to the journal, *NATURE* (Nov. 19), have quite different disease-causing powers than the visible forms of bacteria from which they sprang.

Dwarfs from one kind of bacteria, *Proteus vulgaris*, can revert to the normal form when grown on culture medium without penicillin. Others may be able to do the same.

Plague germs and one of the food poisoning family of germs also can develop dwarfs under certain circumstances.

The whole problem of the "filterable" forms of bacteria, especially those of the tuberculosis and syphilis organisms, may need reinvestigation, Dr Tulasne thinks. Such reinvestigation may, in his opinion, lead to the solution of some outstanding general problems of disease and epidemics.

Science News Letter, December 3, 1949

E FIELDS

FORESTRY

France's Scorched Forests To Supply Europe's Lumber

➤ PROPS for Europe's sagging lumber supply will come from an unexpected source this year France's fire-scorched forests

The salvaged remnant of some of France's most productive forest areas, ravaged by fire this summer, must be disposed of quickly if it is not to be a total loss This source will supply enough commercially usable timber to "remove the danger of a serious European timber shortage in 1950," says the International Bank for Reconstruction and Development in an estimate of the European timber situation

France's permanent loss is Europe's temporary gain The one-year breathing spell, the Bank points out, has been bought with principal rather than interest The lost principal, France's forests, will force France to become an even heavier importer of lumber than formerly, and beginning in 1951 Europe will once more face shortages

The Bank announced this in connection with two loans totaling \$5,000,000 which have just been granted to Finland and Yugoslavia for the development of timber resources Issued in connection with the Timber Equipment Project developed by the Bank, FAO and the UN Economic Commission for Europe, the loans will be used to buy wood-processing equipment

It is hoped that by increasing timber production in the timber-exporting countries, which include, besides Finland and Yugoslavia, Austria, Czechoslovakia and Poland, Europe's dependence on lumber imports from abroad will be gradually lessened

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AGRICULTURE

Tomatoes Grow in Tubes On Synthetic Food

➤ RED tomatoes, as tasty as vine-ripened ones, have been grown on synthetic food from a flower detached from the plant

This is the first time that fleshy fruits have been grown by test tube process though such growth of isolated roots, stems and seed embryos has become classical

The test tube tomatoes were grown by Dr J P. Nitsch of the Kerckhoff Laboratories of Biology at California Institute of Technology, Pasadena, Calif

The tomatoes "tasted like usual tomatoes," he reports in the journal, SCIENCE (Nov. 11). They were seedless and small. Each was about one inch in diameter But each flower had only about an ounce of food

supply at its disposal The lack of seeds, Dr Nitsch says, may have been due to lack of pollination, because the plants were raised in a greenhouse where pollination was very poor, or to killing of the pollen tubes by sterilizing chemicals

The tomato flowers that yielded the test tube tomatoes were of the San Jose variety They were cut from the plant, sterilized with calcium hypochlorite, and planted in glass flasks containing various chemicals No growth occurred in a medium containing only mineral salts, sugar, vitamin B₁ and amino acid, cysteine The addition of sterile juice from either green or red tomatoes caused the ovaries to develop

A week after planting in the glass flasks, the ovaries became visible, pushing up the petals and stamens which had kept them hidden They then enlarged regularly until about the 25th day after full bloom, when growth slowed down

About the 35th day, fruits turned red and ripened at the same time as tomatoes left on the plant

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ENGINEERING

Canals Leading to Mexico's Island Gardens Lack Water

➤ THE waterways of famed Xochimilco, tourist attraction and extensive truck garden region of Mexico's capital city, are suffering from a lack of water due to the severe drought this year The water depth has dropped to only about a foot where a few years ago it was 15 feet deep In places, traffic along Xochimilco's canal has been halted by the low water

A drive by Xochimilco's 25,000 inhabitants is under way in cooperation with the federal district's office of hydraulic resources to raise the water level The island gardens are their livelihood, and if the canals in this Venice-like settlement that dates back to the ancient Aztecs cannot be used, and if there is not water for growing of flowers and vegetables, the business of this Mexico City suburb will suffer greatly

American tourists who are poled by the natives in flower decked boats along the canals do not often realize that Xochimilco supplies nearly all the flowers and four-fifths of the vegetables consumed in Mexico City.

Two rivers are being diverted so as to flow into the lake which contains the network of islands and canals so familiar as a tourist sight Obstructions are being removed from the canals to allow the free flow of water, and the government engineers have found many accumulations of weeds, old tree stumps and roots in the waterways

As a longer time aid to the water supply, hillsides nearby are being reforested with trees. The past summer more than 2,000 students planted 10,000 trees in Xochimilco and other small towns

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AGRICULTURE

They Knew Their Oats And Saved Them, too

➤ HOW a small misfortune was turned into a blessing that saved a large part of the nation's oats harvest, was told by Dr Karl Quisenberry of the Department of Agriculture's Plant Industry Station in Beltsville

Government plant breeders were conducting experiments with a type of oats known as Victoria, Dr Quisenberry said Victoria oats and varieties developed from it are widely grown Suddenly the experimental plot of Victoria oats was struck with a severe blight

From this attack, the scientists knew that in time a similar blight could be expected to attack stands of Victoria oats throughout the Mississippi Valley So they set right to work breeding a variety that was resistant to 'Victoria blight' This head-start enabled them to supply seed of the resistant type to farmers in time Thus a potentially serious crop failure was averted by what at first looked like a piece of bad luck

Specialists in crop diseases, Dr Quisenberry said, must be constantly on the alert for such danger signals, and they must be ready to take advantage of them An example which he cited is a stem rust of wheat, known as Race 158 A vigorous search is now in progress to discover strains of wheat resistant to Race 158, before it cuts loose and does large scale damage to the all-important wheat crop

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ECONOMICS

Economists Urged To Think In Terms of Human Values

➤ ECONOMISTS were urged to consider human values, such as health problems related to money and trade, instead of merely dealing with "abstract curves of choice in theoretical markets."

Dr John M. Clark, economics professor of Columbia University, New York, told the American Philosophical Society in Philadelphia, that his profession should frankly investigate such questions as "What should a wise government do about consumers' freedom of choice and why?"

Those lines and curves on the graphs economists draw should become zones or bands with widths that show how much the values being shown can be expected to vary, if Dr Clark's ideas are followed.

"Economists used to tell politicians what must happen under economic law, despite political efforts to interfere," Dr. Clark said "Now it seems more nearly true that politicians decide what is to happen, leaving economists speculating as to consequences, and whether or not actual policy is fatally unsound"

Science News Letter, December 3, 1949

ARCHAEOLOGY

Stone Age Alaskan Found

An Eskimo legend led to the discovery of Stone Age Man in Alaska. Their stone tools and weapons mark them as the equal of Europe's famed Cro-Magnon man.

By VINCENZO PETRULLO

➤ "THOSE were made by the dwarf"

The Eskimos crowded around the puzzled white man holding several tiny pieces of chipped stone in the palm of his hand

"What dwarf?" the archaeologist asked the excited Eskimos

"Only the little dwarf could have made such small tools. He lived a very long time ago. He was very small, only knee-high, but he had great powers. He could make great magic. He could do anything. He was a great chief. Come with us. We will show you where he lived."

Top Discovery of Year

The archaeologist listened to the legend and let the Eskimo lead him to where the dwarf had lived. As a result there has been unearthed on the shores of Bering Sea evidence of America's earliest ancestors of modern man, Old Stone Age Americans who lived from 10,000 to perhaps 20,000 years ago when the Great Ice Age was almost over.

Corroborating evidence has been found by Dr. Helge Larsen of Copenhagen's Danish Museum who dug at a cave site on Seward Peninsula, about 100 miles farther north.

To archaeologists and anthropologists this is the top discovery of the year.

For the Old Stone Age Alaskans are shown by their unusual stone tools and weapons to be the equivalent of Europe's famous Cro-Magnon men, who painted wonderful drawings in caves and were as handsome as the best-looking people of today.

The American archaeologist who listened to the Eskimo legend and was led by it to make the discovery is Prof. Louis Giddings, a young man, quiet and unassuming, whose frail appearance makes him seem more like the arm-chair professor than an Arctic explorer. He is director of archaeological research at the University of Alaska and leader of an expedition searching for ancient man on Bering's shores.

The Eskimos, excited though they were over finding the small tools, had originally been reluctant to camp at Nukleet, the site where they were found.

"No one has camped here," they told Prof. Giddings, "since the time when an unnatural son killed and ate his own mother here."

Prof. Giddings found no evidence of

cannibalism at Nukleet, but, digging through a number of layers, he did find evidence that the place had been occupied as far back as 2,000 years ago by the Eskimos. In the lowest layer consisting of water worn pebbles, indicating a former beach, he found the microliths, small man-chipped flakes of flint stone which the Eskimos quickly attributed to the legendary dwarf.

Intrigued by the story, Prof. Giddings followed his guides to the other side of the peninsula to a spot on Norton Bay opposite Seward Peninsula called Iyatayet by the Eskimos. It was at this site that he discovered the buried relics of paleolithic (Old Stone Age) man.

No Bones at Iyatayet

Iyatayet is a stretch of swampland connecting the ten-mile-long, one-mile-wide basaltic ridge known as Cape Denbigh to the mainland. A fresh water stream flows through it, insuring drinking water the year around. There is no sure source of fresh water at any other place on the Cape. It is probably for this reason that the site

was a favorite camping place for the primitive hunters who lived in that part of Alaska. The area shows signs of human occupation as much as a quarter of a mile from the present shoreline.

But the water which attracted these ancient people to the site also has prevented preservation of their bones for modern scientists to find. No human or animal bones have been discovered.

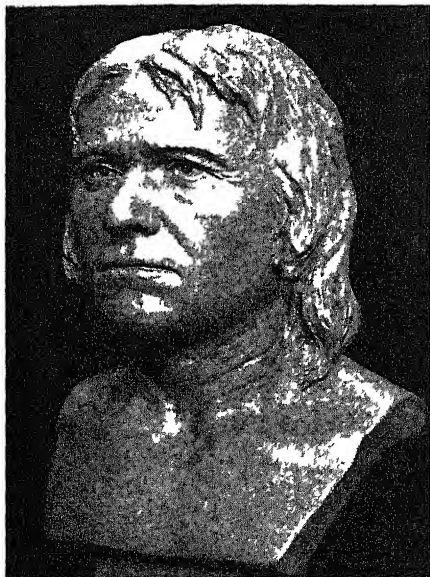
In that portion of the site excavated by Prof. Giddings, he found the top layer consisted of the floor logs of an Eskimo pit dwelling built about 300 years ago. Beneath these logs he found a clay bed containing relics of the Ipiutak Eskimo culture. These Eskimos hunted whales, bartered iron tools from Siberia and decorated ivory with animal figures. Many features of the Ipiutak culture show a connection with the new stone age in northern China and Siberia. The Ipiutak Eskimos appeared in Alaska about 2,000 years ago.

Up to this point the site showed nothing unusual. The culture sequence was the same as that at Nukleet on the opposite side of the peninsula.

Continuing to dig deeper, Prof. Giddings came upon a series of layers of sterile clay from six to 18 inches thick.



IYATAYET EXCAVATION SITE—Beneath this site were found relics of the oldest American ancestors of modern man. The burns, a particular type of microlith, found here are identical with those made by Cro-Magnon man.



CRO-MAGNON MAN—The newly discovered Stone Age Alaskans are the equivalent of Europe's Cro-Magnon Man, above, who was artistic and very much like the modern European in appearance.

No sign of human relics was found in this clay, showing that the site was uninhabited for a considerable period of time

Flint Implements Found

It was beneath these layers of clay that Prof Giddings discovered a large quantity of extraordinary obsidian and flint implements. So many miniature chipped flints were found and of such exquisite workmanship that the Eskimo guides immediately revised their legend of the dwarf. Unquestionably the dwarf had made many of the flints but, said the Eskimos, "there must have been a lot of little people—a whole race of them."

The flints lie in a bed of pebbles, indicating that this layer was formerly a beach. Since the layer is about 40 feet above sea level the land must have risen considerably through the ages. Geologists are busy studying the site to determine how long ago the beach was at sea level and how long ago the sterile layer of clay on top of it was deposited. It may have been washed in by the stream in time of flood and deposited as the waters went down, but this must have occurred many times to account for the lamination.

The implements found were made by striking off long flakes from the flint and obsidian cores. Some of these flakes were then chipped carefully. Distinguishing features of the chipping are the serrated or saw-tooth edges so finely done that the teeth along the edges are scarcely visible to the naked eye and fine diagonal flaking across the flat sides. Chipped microliths are found in Old Stone Age layers in Europe but the serrated edges of the Iya-

tayet specimens make them unique. No similar implements are known from anywhere else in the world.

Link with Cro-Magnon

Associated with these extraordinary microliths are the so-called burins which definitely link the site with European Cro-Magnon. Burins are microliths which have as an added feature a sliver knocked off one of the edges. The Iyatayet burins are identical with those made by Cro-Magnon Man.

The diagonal flaking on the microliths is found also in the Yuma points discovered in the Finney site in Wyoming but the Yuma points are much larger and cruder than the Iyatayet. Both Yuma and Folsom type implements are found associated with the Iyatayet microliths. Yuma and Folsom points may be as old as 25,000 years. The makers of the Iyatayet microliths were evidently familiar with the bigger Yuma and Folsom implements as well as with the burins found in the Aurignacian culture in Europe produced by Cro-Magnon Man. Thus Iyatayet may be the missing link between the ancient cultures of Texas and Wyoming and the Old Stone Age culture of Europe.

Europe's Cro-Magnon Man was tall and straight, very much like the modern European. He may have been white. He lived at the edge of the glaciers in western Europe, especially in France and Spain. Although he made fine flint implements, he is most famous for his art. On the walls of deep caves in southern France and Spain he painted beautiful pictures in an extraordinary realistic style of the animals he hunted. This beautiful cave art still is in a wonderful state of preservation. It was never equalled by the people who occupied this region of Europe after Cro-Magnon Man. What happened to this talented race remains a mystery. Did it move northward with the retreating glaciers and finally find its doom in the Arctic regions?

Questions Await Answer

The actual dating of the Iyatayet material will depend on the findings of the geologists. The key to the site is the layer of laminated clay. So far several things are certain. The microliths are older than anything found in Alaska before. They antedate the Ipiutak Eskimo culture of 2,000 years ago. The burins resemble those found in Aurignacian layers 15,000 to 30,000 years old. They may have been made that long ago either by a Cro-Magnon people or by another people who were familiar with the implements of these Old Stone Age people and the art of making them.

How old are these flints? Who made them? Is there any truth to the Eskimo legend of a dwarf or pigmy people? Will Cro-Magnon Man be found in the New World? These are some of the questions that Prof Giddings will try to solve next

summer when he resumes excavating. Special effort will be made to locate dry caves, such as that explored by Dr. Larsen, in the hope of finding actual human bones in association with the flint implements.

More discoveries like those made at Iyatayet may solve the mystery. The University of Alaska, the University of Pennsylvania Museum and the Copenhagen Danish Museum, under whose auspices the discoveries were made, are planning to intensify their cooperative efforts to determine who were the earliest human inhabitants of the American continent.

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MINING

Tracer Bullet and Flint Metals Are Found in U.S.

➤ TRACER bullets for machine gun practice and the flints in cigarette lighters may soon be made from rare earth elements uncovered in southeastern California instead of from imported ores. These same rare earth elements are artificially produced by atomic piles in very high purity, but in limited amounts, and are used by scientists to study alloys for use at extremely high temperatures.

Discovery of at least five veins, three of which contain considerable amounts of fluocarbonate of cerium and lanthanum combined with thorium and uranium, was announced by the U. S. Geological Survey. This discovery makes the United States more independent of foreign sources, mainly Brazil and India.

Clarence Watkins and Herbert S. Woodward of Goodsprings, Nev., two of the owners of the property, discovered the deposit when the minerals were found to be radioactive by test with a Geiger counter.

Interest in the rare earth elements has been greatly stimulated by the fact that they are in the group of fission products produced by the splitting of uranium. Also elements, known as trans-uranium elements, that are not found in nature but are built by the addition of atomic particles to uranium, have the same structure as the rare earths and are of great theoretical interest to chemists and physicists.

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ECONOMICS

Europe Recovery Thwarted

➤ "POLITICAL boundaries are thwarting the economic rehabilitation of Europe and hampering the economic growth of many other regions of the world," Dr. Howard A. Meyerhoff, geographer and geologist, and administrative secretary of the American Association for the Advancement of Science, told Science Service.

Dr. Meyerhoff, who was a professor at Smith College for 25 years, said he thought that very few Marshall Plan officials realize the necessity for permitting the development of a natural industrial region in Europe centering around the iron ore of the German Ruhr and the coal resources of French Lorraine.

However, Dr. Meyerhoff said, the political and economic integration of Europe for which ECA Administrator Paul Hoffman is working would be of some help in the development of this Ruhr-Lorraine natural region.

Dr. Meyerhoff develops this idea of natural industrial regions in *THE AMERICAN SCHOLAR* (Winter Issue), published by Phi Beta Kappa. Mere possession of basic raw materials such as iron ore and coal, Dr. Meyerhoff writes, is not enough to make a nation rich. High living standards, he says, depend on the free flow of raw materials,

machines and some consumer goods.

"Basically," declares Dr. Meyerhoff, "there is no such thing as a well-rounded national economy, even among those nations that nature has favored."

Instead, he asserts, the industrial world is organized into several clearly defined industrial nuclei that dominate trading areas of varying sizes and importance. These nuclei are localized around centers of maximum energy production, such as the coal fields of the Appalachian-eastern interior of this country and the mudlands of Britain. When political boundaries get in the way of the free flow of goods to and from these areas, he declares, the standard of living is lowered.

Dr. Meyerhoff told Science Service that a good example of an industrial nucleus which has been choked off by political boundaries before it had a chance to get started can be found in Newfoundland and New Brunswick, Canada. Newfoundland has the world's sixth largest reserve of iron ore, and New Brunswick has good coal resources. Those resources could serve a region extending down through New England to the Hudson river, he declares, were it not for the tariffs to be found at the Canadian-American border.

Science News Letter, December 3, 1949

GENETICS

Huxley Indicts Lysenko

➤ JULIAN Huxley, British scientist and former Director-General of UNESCO, accuses Trofim Lysenko, President of the Lenin Academy of Agricultural Sciences, of destroying scientific method and of dividing the world of science into warring camps based on political differences.

His new book, just published, *HEREDITY EAST AND WEST* (Schuman), is a carefully documented indictment of Lysenko's genetics and his use of it to destroy the impartiality of science as it is known in the West.

"I at first imagined," writes Dr. Huxley, "that there might be something in Lysenko's claims. However, the more I heard and read, the clearer it became that Lysenko and his followers are not scientific in any proper sense of the word—they do not adhere to recognized scientific method, or employ normal scientific precautions, or publish their results in a way which renders their scientific evaluation possible."

Although Dr. Huxley shows point by point that Lysenko's theories are invalid, unprovable, or downright false, he states that, "it speedily became clear that the major issue at stake was not the truth or falsity of Lysenko's claims, but the over-

riding of science by ideological and political authority."

Despite a Russian attack on himself as "the specious director of UNESCO," Dr. Huxley takes pains to point out that he is "not concerned to be either anti-Soviet or pro-Soviet." He adds, "I consider that the methods used by certain groups and certain sections of the press in the U S A to denigrate (defame) the U S S R and to foment hatred of communism are equally bad and equally regrettable."

"If I criticize or condemn some of the methods used, that is not because I am hostile to the U S S R," writes Dr. Huxley, "but because I believe that they are bad—bad in themselves, bad in their effects on human progress and achievement, and in the long run for the U S S R."

Science News Letter, December 3, 1949

ENGINEERING

Fluorescent Light Gives Natural Look to Colors

➤ THINGS look more like they ought to under a new fluorescent lamp announced by the lamp division of General Electric, in Cleveland. Due to a new phosphor in

them, the lamps bring out the "full beauty" of all colors, and are complimentary to people's complexion.

The new phosphor, a coating to use inside the lamp's tube to convert invisible light waves to visible light, is a "double-activated calcium phosphate," G. E. scientists state. It is designated the DR phosphor. It will be used in two new lamps, a "de luxe cool white" and a "de luxe warm white" lamp, the latter particularly desirable in social environments such as beauty shops, restaurants and homes.

Science News Letter, December 3, 1949

Words in Science— ALLIGATOR-CROCODILE

➤ MANY people are interested in the difference between two closely related reptiles, the alligator and crocodile.

You can tell the American alligator from the American crocodile principally by the nose. The alligator has a broad head bluntly rounded at the nose, the crocodile nose narrows to a point having a notched, cut-in outline.

There is a difference, too, in the teeth, although you may not care to investigate this too carefully. What corresponds to the canine teeth on the lower jaw of the alligator are hidden when the jaw is closed, fitting into a pit in the bone of the upper jaw. Corresponding teeth of the crocodile fit into a notch on the outside of the upper jaw.

There is, however, a great difference in disposition. The alligator is sluggish, and even when enraged is inclined to stand in one position, thrashing his tail. The crocodile is active, vicious, and will pursue and attack.

Science News Letter, December 3, 1949

VETERINARY MEDICINE

Wild Bulls Are Pacified By New Drug Injection

➤ A NEW drug, berbeerine, which calms down excited animals long enough for the veterinarian to operate on them, was reported in the journal of the American Veterinary Medical Association.

Kicking, lunging, rearing animals are quickly pacified by an injection of berbeerine, the full name of which is dimethylberbeerine hydrochloride. Veterinarians in Argentina who have used the drug in surgical operations, have found that its action greatly reduces danger to both doctor and beast.

The drug acts as both a pacifier and pain-killer. Its effect lasts for about 20 to 30 minutes.

Science News Letter, December 3, 1949

How to extend Christmas

THE WHOLE YEAR THROUGH

FOR THE MOST UNUSUAL PERSON
ON YOUR CHRISTMAS
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Plant Hormone	Coffee	Phosphorescence
Unusual Fabrics	Nylon	Dry Cell
Plywood	Sound Recording	New Flower Seeds
Oyster	Home & Office	Electronics
Lodestone	Tricky Minerals	Coffee Byproducts
Rayon	Glass Lens	Cellulose Plastics
Coins	Rope	Specialized Textiles
Felt	Plastic-Coated Yarns	Fungicides
Casein	Insecticides	Impregnated Paper

You know the one who would thank you again and again for such a gift. And if you are not yourself a member, you could hint to someone that you'd like it as a gift yourself.

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Squirrels

➤ A LADY with a marked distaste for rodents was strolling in the park one day. A squirrel, emboldened by intimations of hunger brought on by portents of impending winter, ran up to her with a mute plea for a handout.

Steeling herself to look the little beggar in the eye, the lady exclaimed, "Go away! You don't fool me for one minute with your big bushy tail, you little rat!" The squirrel didn't tarry to hear more. With the days getting shorter and a winter's store of nuts to get in, he hastened off to fill his quota in more sympathetic quarters.

This is a true story. Both the lady and the squirrel can attest to it. And although the lady is no zoologist, she very deftly, with the intuition for which her sex is famed, touched the very heart of the matter. For the kinship between squirrels and rats is very close indeed.

Squirrels and rats, together with mice, woodchucks, gophers, chipmunks, beavers and muskrats, to name only some members of the order, are members of the rodentia. The rodents, highly prolific in a family way, are also extremely prodigal in the variety of species and genera that comprise the clan.

But of them all, the squirrel is perhaps

unique for his purely decorative value. On the hoof that is. No self-respecting park would be without its quota of squirrels. In fact, few other animals make their home there. The only other animals seen in parks with any frequency are the familiar biped, with or without his dog, and of course pigeons, sparrows and starlings, among the commoner birds.

At this season of the year, the squirrel is at his busiest. He scurries hither and yon, looking for nuts and cones to lay by for the grim days ahead. In urban areas, as noted above, he sheds any timidity he may still retain, accosting total strangers. At his tamest, he is astonishingly audacious. Park bench philosophers have been known to reach absent-mindedly into their coat pockets only to find an optimistic squirrel ferreting there for stray goobers.

The red squirrel, sketched here, is a denizen of the northern part of the country. No one who has walked through the fall woods can have failed to notice him. He is a notorious chatterbox, filling whatever quarter of the woods his business takes him to with his grievance of the moment.

He scolds his wife, harangues his enemies, and heaps fluent abuse on any mere human who happens to stray within the very considerable range of his voice.

But despite the endless charm he finds in filibustering, he does a very methodical job of marketing for the winter larder. He

is a superior judge of nuts and seeds, and despite the impression he gives that half his attention is directed elsewhere, very rarely can a bad nut or spoiled seed be found hidden in his winter cache. He has mastered the knack of doing two things at once.

Science News Letter, December 3, 1949

During the past war, a total of 12,000,000 tons of refuse was collected in the United Kingdom and converted into \$140,000,000 worth of agricultural and industrial materials, including airplane parts made from waste paper.

To be Published Spring, 1950

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- The geographic range covered in the new manual is the same as in the Seventh Edition except that it has been extended eastward to include the Gaspé Peninsula, Anticosti, and Newfoundland.

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ATOMIC ENERGY COMMISSION OFFICIAL RECORDS, 4th Year, Special Supplement No. 1—Atomic Energy Commission—*United Nations*, 75 p., paper, 80 cents Background on the pressing problems of atomic energy control, these records include general findings and recommendations approved The text is in both French and English

BETTER CARE IN MENTAL HOSPITALS Proceedings of the First Mental Hospital Institute—Daniel Blain, Ed *American Psychiatric Association*, 208 p., paper, \$3.00 The complete record of the meeting held at the Institute of the Pennsylvania Hospital in Philadelphia, April 11-15, 1949

THE DESIGN OF DEMOCRACY—Laurence Stapleton—*Oxford*, 301 p., \$4.00 The author, a Guggenheim fellow, discusses the ideas and ideals on which democracy is based, and suggests how world affairs can be conducted in a more democratic manner

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HEALTH INSTRUCTION YEARBOOK 1949—Oliver E. Byrd—*Stanford University Press*, 7th ed., 276 p., \$3.50 Health developments for the year 1948

HYPNOTHERAPY OF WAR NEUROSES A Clinical Psychologist's Casebook—John G. Watkins—*Ronald*, 384 p., \$5.00 A report of psycho-

therapy practiced by the author in the neuro-psychiatric division of an Army convalescent hospital during the past war

ISOTOPES A Three-Year Summary of U S Distribution—United States Atomic Energy Commission—*Gov't Printing Office*, 201 p., illus., 45 cents Provides a useful measure of the value of isotopes to peacetime research Lists 1850 publications that have been issued on work done with these products of the atomic energy program

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SCIENCE AND CIVILIZATION—Robert C. Stauffer, Ed—*University of Wisconsin Press*, 212 p., \$2.50 Eight prominent scholars discuss the social implications of science One of the symposia held in celebration of the University of Wisconsin's centennial year

SHUSHIN THE ETHICS OF A DEFEATED NATION—Robert King Hall—*Bureau of Publications, Teachers College, Columbia University*, 244 p., \$3.75 Presents in historical perspective an analysis of the ethics teaching in Japanese schools immediately before the Second World War

THE TVA IDEA—Dean Russell—*Foundation for Economic Education*, 108 p., paper, 75 cents The author sees in projects such as TVA a threat to American freedom

TECHNIQUES OF COLLECTING MICROVERTEBRATE FOSSILS—Claude W. Hibbard—*University of Michigan Press*, 19 p., illus., paper, 50 cents A description of collecting methods and their application on a large scale to the study of Cenozoic stratigraphy and fossils

THEORY AND PRACTICE OF SOCIAL CASE WORK—Gordon Hamilton—*Columbia University Press*, Ninth printing, 388 p., \$3.50 Analyzes current theory and practice

U S INDUSTRIAL DESIGN '49 '50—Society of Industrial Designers—*Studio Publications*, 176 p., illus., \$10.00 Presents work by leading members of the profession

WINTER BOUQUETS WITH COLOR The Art of Arranging Dried Flowers—Ruth Gannon—*Studio Publications*, 72 p., illus., \$2.85 The author writes on the correct method of picking, drying and arranging your winter flowers and also how to pick your colors

A WORD GEOGRAPHY OF THE EASTERN UNITED STATES—Hans Kurath—*University of Michigan Press*, 88 p., with 163 figures, illus., \$4.00 The results of an investigation concerned with the regional and local vocabularies of the original 13 states and all territories settled before 1800 except Kentucky Reference for students of Americana and regional sociologists

YATES' GUIDE TO SUCCESSFUL INVENTING—Rymond F. Yates—*Funk*, 224 p., illus., \$2.95 A wealth of practical information including patent helps and how to market your inventions

Science News Letter, December 3, 1949

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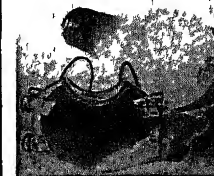
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• New Machines and Gadgets •

For addresses where you can get more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., Washington 6, D. C. and ask for Gadget Bulletin 494. To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription.

⚙️ **ADJUSTABLE SHOE HEEL**, recently patented, is constructed in two parts, the rear portion being round in shape and held to the top lift of the heel with screws. When this disk becomes worn on the "walking edge" it can be rotated to a new position by loosening the screws, or it can be replaced.

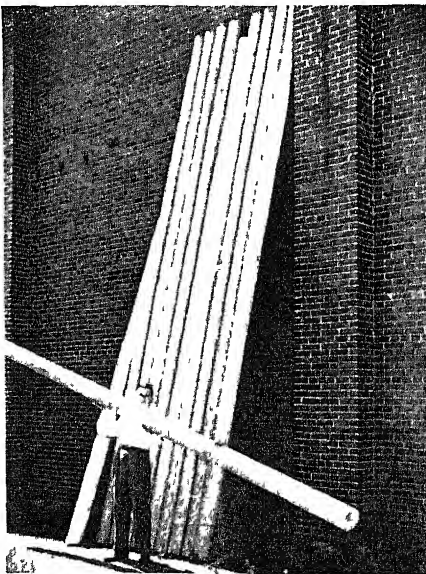
Science News Letter, December 3, 1949

⚙️ **ROLLING MAST** on dry land, in use by the U. S. Navy, will perform all the gyrations of a mast on a ship in a storm. Any combination of roll, pitch and yaw can be obtained with this 75-foot mast by electrical machinery. The mast is for use in testing instruments under severe conditions.

Science News Letter, December 3, 1949

⚙️ **MAGNETIC STIRRER**, for laboratory use, operates on either steam or compressed air to effect stirring action at stambath or room temperatures. Since there are no electrical components, it is completely safe to use with inflammable, volatile substances and in hazardous locations.

Science News Letter, December 3, 1949



⚙️ **GLASS PIPE**, shown in the picture, is actually glass fiber impregnated with resin, and has as its chief value its lightness. The weight is about one-fourth that of comparable steel pipe. It was developed for

use by the U. S. Armed Services in cross-country fuel lines.

Science News Letter, December 3, 1949

⚙️ **CIGARETTE LIGHTER FUEL**, an English preparation which comes in a two-inch gelatin container and is now available in America, can also be used to remove stains and grease, clean glasses and remove lipstick from collars. The container is unbreakable but easily opened with a pin.

Science News Letter, December 3, 1949

⚙️ **CARRYING CASE** for ladies' hosiery, cosmetics and handkerchiefs is a handleless handbag-like affair with four snag-free pockets, each about six inches square. Made of a quilted, satin-textured vinyl plastic, easily washable, it comes in four color combinations.

Science News Letter, December 3, 1949

⚙️ **LUGGAGE CARRIER** has folding frame with castor wheels and is designed for easy cartage of suitcases, trunks and packing cases weighing up to 300 pounds. Rubber-covered gripping posts leave luggage unmarred, and its rubber-covered swivel wheels protect fine floors. The device weighs less than two pounds.

Science News Letter, December 3, 1949

• Do You Know? •

The *chrome* on the family car can be cleaned with a good household scouring powder.

Norwegian educators are bringing instruction in English by radio to even the most remote rural schools.

The *prime meridian*, Greenwich, London, now generally recognized throughout the world, was adopted by international agreement just 65 years ago.

The true *Iceberg lettuce* is a variety with red-tinged leaves that has no commercial value; what is purchased as Iceberg is the New York and Imperial strains.

A new type of *bus* already on American highways has a 17-passenger compartment in the front half and an equally large compartment to the rear to carry freight.

Musk rats, quarantined from Norway for years, may soon become highly-favored animals in northern sections where it is now suggested they be raised, principally for their fur.

At any given moment, some 1,800 *thunderstorms* are probably occurring throughout the world.

About one-third of *coal* is volatile matter easily driven off by heat and lost up the chimney unless proper furnace-firing methods are used by the home-owner or firemen.

The United States could support a *population* double its present size at a standard of living eight times as high as now, a prominent economist recently stated.

Malaria-bearing mosquitoes have a habit of resting on the walls of houses after getting a meal of blood, a habit that makes them easily killed by DDT if the walls have been sprayed with this insecticide.

Fuchsias, a familiar house plant of several decades ago and now becoming popular again, was often known as Lady's Eardrops because of the form of its flower; in its native South America it grows to a shrub or tree.

Florida sands containing *titanium* and *zirconium* are being drill-explored in 10 counties by the federal government in anticipation of expected wider uses of these metals, particularly titanium for use in construction.

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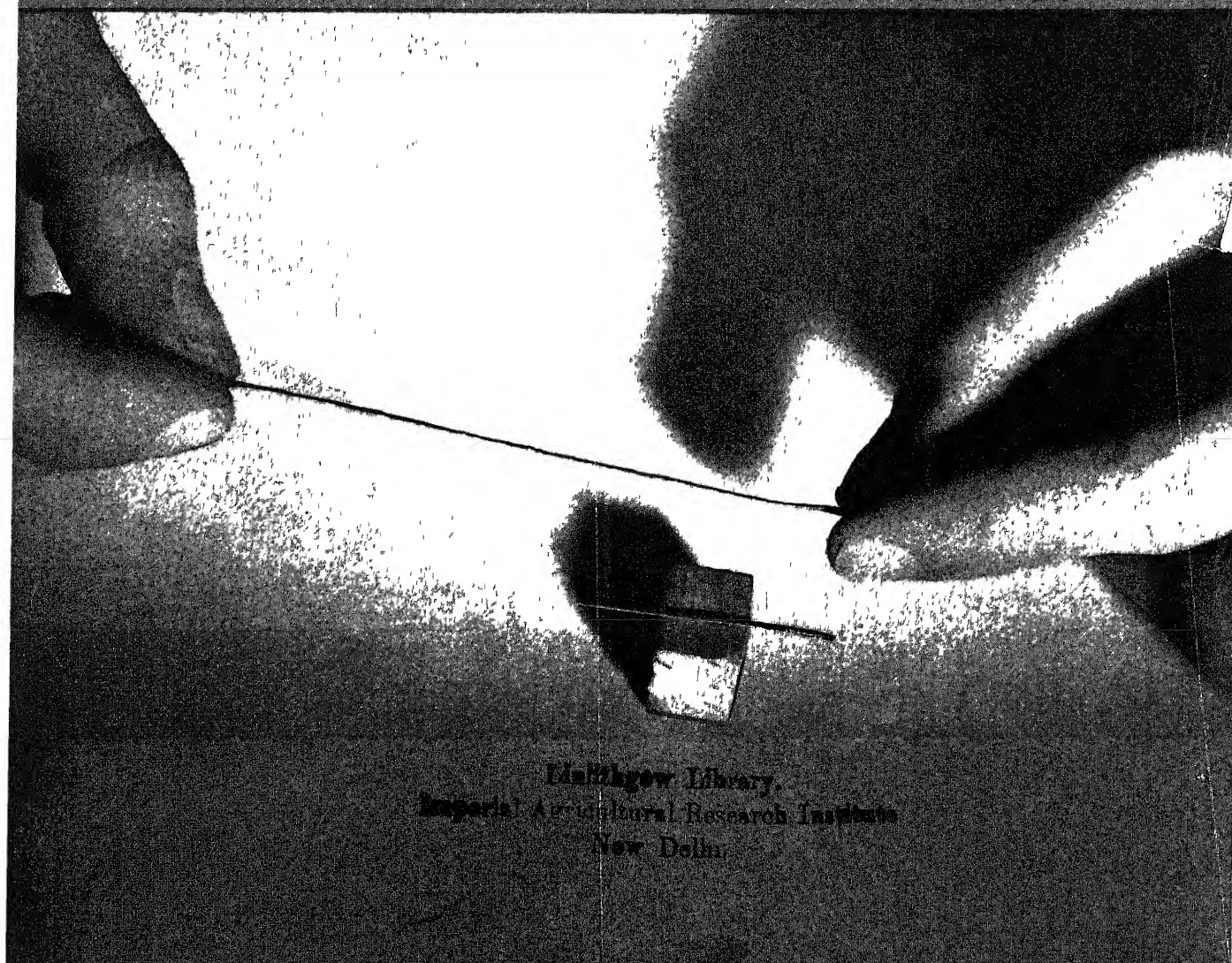
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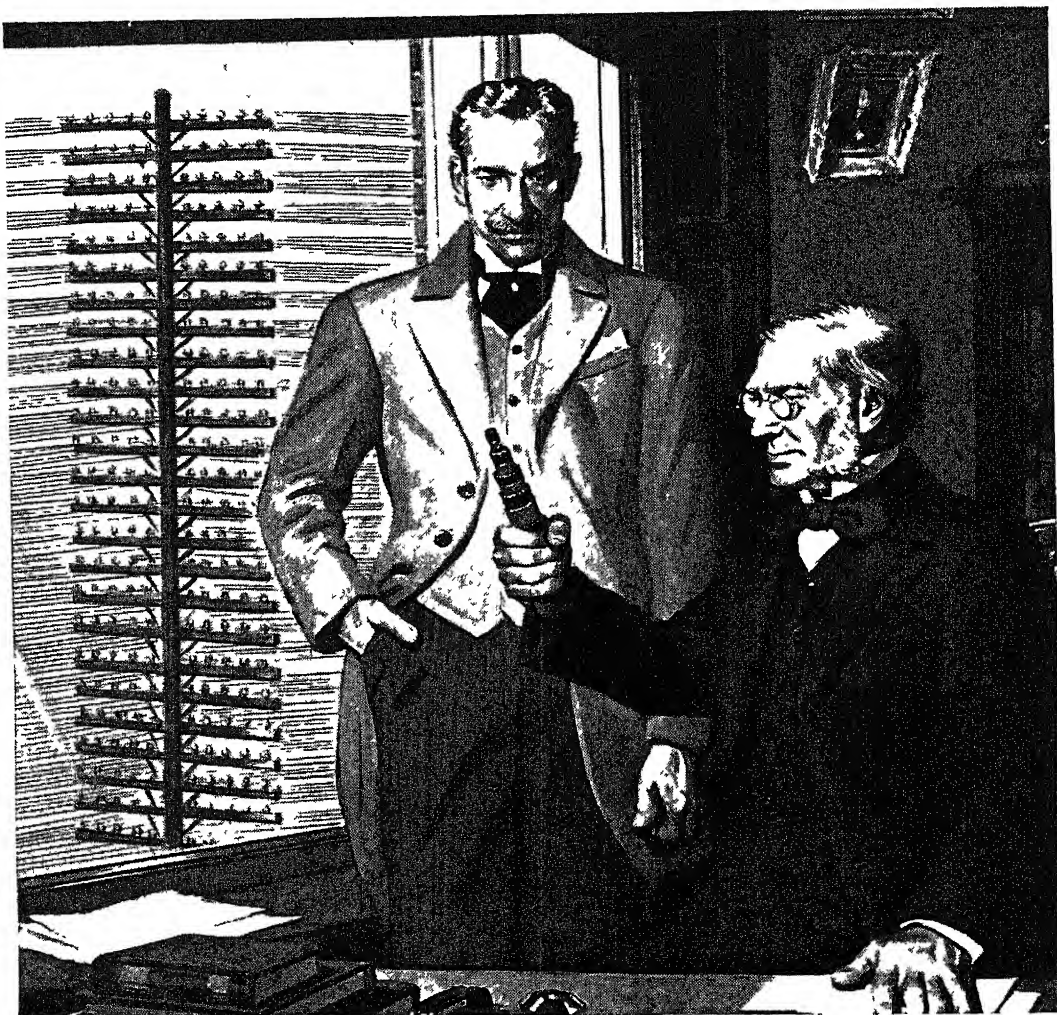
Trick Metals

See Page 378

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VOL. 56 NO. 24 PAGES 369-384



They Packed a Pole Line Into a Pipe

Back in the eighties, telephone executives faced a dilemma. The public demanded more telephone service. But too often, overloaded telephone poles just couldn't carry the extra wires needed, and in cities there was no room for extra poles. Could wires be packed away in cables underground?

Yes, but in those days wires in cables were only fair conductors of voice vibrations, good only for very short distances. Gradually cables were improved, soon

every city call could travel underground, by the early 1900's even cities far apart could be linked by cable.

Then Bell scientists went on to devise ways to get more service out of the wires. They evolved carrier systems which transmit 3, 12, or even 15 voices over a pair of long distance wires. A coaxial cable can carry 1800 conversations or six television pictures. This is another product of the centralized research that means still better service for you in the future.



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MEDICINE

Cobalt Treats Cancer

Victims of cancer of the cervix have been treated with radioactive cobalt. Results are expected to indicate an improvement over the use of radium.

➤ THIRTY-FIVE cancer patients, chiefly women with cancer of the cervix (neck of the womb), have during the past year been treated with cobalt made radioactive in the Atomic Energy Commission's pile at Oak Ridge, Tenn.

The results should be slightly better than those that would be expected if radium had been used, although it is too soon and too few patients have been treated so far to be sure of this.

The treatments are being given under the direction of Dr. J. L. Morton at Ohio State University School of Medicine at Columbus. Development of the radiocobalt for this purpose was done by Dr. William Myers, physicist and physician, who is a special fellow at the same university.

Reasons for expecting slightly better results with radiocobalt than with radium are 1. The cancer-destroying gamma rays from cobalt made radioactive in the pile are more energetic than those from radium in the form used in cancer treatment. The radium may deliver anywhere from 400,000 to slightly over 2,000,000 volts of energy but the cobalt will always deliver over a million volts from the same unit of material. This means physicians can give a more controlled and homogeneous dosage.

2. Radiocobalt can be put in places where radium cannot be placed. This means, in cases of cancer of the cervix for example, that the cancer-destroying radiation can be brought not only to the primary cancer in the neck of the womb but also to the broad ligaments which help hold it in place and to the walls of the pelvis. These are not reached with radium as ordinarily used, but they are regions where metastasis, or the spread of cancer, often occurs.

One of the chief advantages of radiocobalt over radium is that the beta rays from radiocobalt have only one-tenth the maximum energy of the beta rays from radium disintegration products. These beta rays from radium are strong enough to damage or kill healthy tissue around the radium needles. That is why radium needles used in cancer treatment are enclosed in a thick layer of gold or platinum. The gold or platinum in a single needle costs from \$10 to \$25, without counting the cost of the radium. The radiocobalt can be sheathed in less costly stainless steel or the relatively cheap metal, aluminum. These, or even a moderately thick tubing of nylon, are not only cheaper and handier but actually remove all the beta rays from the radiocobalt, whereas the platinum (in one-half millimeter thickness) does not remove all the

beta rays from the radium.

The radiocobalt can be recovered from the aluminum sheathing by dropping the whole thing into sodium hydroxide solution. This dissolves away the aluminum but does not dissolve the cobalt.

Because radiocobalt can be sheathed with materials like nylon and aluminum, and because it does not dissolve in body fluids such as blood, it can be used in ways radium cannot. The needles, for example, can be bent into different shapes and forms to fit the cancerous spot, or even can be wrapped right around the cancer. Doing this with radium needles would be dangerous because of the possibility of breakage. If a radium needle broke, radium salts escaping from it would be dissolved and carried by the blood to the bones, there to cause bone and life-destroying cancer. Needles of radon gas, if they broke, would

be equally dangerous. But the radiocobalt needles, if they should break though none has so far, do not carry this danger because the cobalt is not soluble.

The radiocobalt can be handled with an electromagnet, giving it another advantage over radium needles.

A "porcupine applicator" has been designed by Dr. Morton for using the radiocobalt in treatment of cancer of the cervix. This consists of several layers made of a plastic such as lucite or plexiglas with holes bored at various angles. The radiocobalt needles are fitted into these holes and the applicators applied in tiers, one over the other. The needles automatically go into the right locations when the applicator is inserted and there is no danger of creating "hot spots" where ulcers might form from crossing over of radiation from the different needles.

Recently Dr. Myers has been preparing the needles of pure cobalt. The first ones were made of an alloy of 45% cobalt and 55% nickel. Their size is such that laid side to side it would take about 25 of them to measure one inch, and their length is about one-third of an inch. These are sent to Oak Ridge, put in the pile, and come back each with radioactivity equivalent to one or one and one-half milligrams of radium.

Science News Letter, December 10, 1949



STREAMLINED "FLYING BANANA"—The Navy's new Piasecki HRP-2 is pictured during early flights at Morton, Pa. Its aluminum fuselage is the latest development in helicopters in the program to help America maintain leadership in transport type rotary wing aircraft. As many as 12 litter patients can be carried in the HRP-2. This type of aircraft is particularly suitable for mass rescues under the most adverse conditions and for troop-carrying assault tactics.

NUCLEAR PHYSICS

Atom "Breeding" Plant

➤ SEVEN years after man first achieved the self-sustained release of energy from the atom, construction will start on a plant to "breed" energy-releasing atoms from the non-exploding variety

On Dec 2, 1942, the first atomic pile, built under the University of Chicago's athletic field stands, was brought to the point where neutrons from the fissioning, or splitting, of uranium 235 became sufficient to sustain and repeat the action. That was the most essential step toward the atomic bomb.

On Dec 1 this year, the Atomic Energy Commission had transferred to it Naval Proving Ground property near Arco, Idaho, to be used as the site for another basic experiment in atomic energy. This will be the testing of the possibility of transmuting non-fissionable uranium into fissionable plutonium in a process that produces more fissionable material than it consumes. If the experiment is completely successful, the amount of fissionable material available for peaceful as well as possible military purposes will be increased by 140 times. The actual increase may not be as great as that, but scientists are sure they will have more fissionable material from the "breeder reactor" process than they start with. And any increase will be advantageous. Figures on the expected increase start from the fact that only seven-tenths of one percent of natural uranium is in the form of the fissionable uranium 235. The transmutation process allows use of the more plentiful though non-fissionable uranium 238.

"Breeder" will not solve the raw material problem overnight, but the application of the breeder principle is considered the biggest forward step in peacetime application of atomic energy.

On pencil and paper, AEC authorities are sure that the engineering applications

as well as the purely nuclear-physical ones of the transmutation can be made. But the final answer will not come until some time in 1951 when the breeder reactor goes into operation. No trial runs with models can be made. Breeding must be done on a large scale if at all, because, as in the atom bomb, there is the problem of critical size.

Science News Letter, December 10, 1949

GEOLOGY

Pacific Coast Was Balmey 50 Million Years Ago

➤ MODERN man, if he were transported back through geological time about 50 million years, would find a strange climatic situation in the Pacific area.

As far north as Puget Sound he would be in the tropics. He could sit under a palm tree, and watch the surf pound against coral reefs.

He could bathe in warm waters, and catch tropical fish. He would have to keep on the alert, however, for crocodiles.

This is a partial picture of a section of the ancient world being pieced together by Dr. J. Wyatt Durham, associate professor of paleontology at the University of California. It is based upon Dr. Durham's studies of fossil specimens of marine animals in the Pacific Coastal region during the Eocene epoch, and upon research by others in allied fields.

The scientist said that since the Eocene epoch there has been a gradual shift of the tropical climate southward. This gradual shift was interrupted by rapid fluctuations both north and south during the Ice Age.

Dr. Durham has also refuted the widely held theory that the poles and continents shifted around during this past age. He

points out that the evidence indicates no major shifts of either the poles or continents in the past 50 million years.

For example, advocates of the theory of shifting poles would place the Kamchatka peninsula within 15 degrees of the North Pole at one time in this past age. However, the fossils of marine life of Kamchatka for that period are representative of a warm water environment. These animals could not have existed within 15 degrees of the North Pole, therefore the pole must have been in approximately its present position.

Science News Letter, December 10, 1949

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PHYSICS

Germanium Transmits Heat

Lenses of germanium which will transmit invisible heat rays have been developed. This promises spectacular improvement in infrared equipment.

► LENSES that will transmit invisible heat radiation, promising spectacularly improved infrared equipment for scientific and industrial use, can be made out of pure germanium and silicon metals as the result of researches made known to the American Physical Society at Chicago, Ill., by scientists from Purdue University.

Even though the metals are opaque to ordinary light and may be an inch thick, they transmit the infrared rays over a broad portion of their spectrum. Heretofore, rock salt and other materials softer than metal and attacked by moisture have been used for optical work with infrared radiation, which war applications showed was important for many uses.

The researches were done by a group of scientists headed by Dr. Karl Lark-Horovitz of the Purdue physics department and including K. W. Meissner, M. Becker and H. Y. Fan.

These researches are the outcome of electrical measurements on germanium alloys, which Dr. Lark-Horovitz and his colleagues in 1942 produced in such a way

that it was possible to make them semi-conducting either negatively or positively. Semiconductors with known and predictable properties were available then for the first time.

Investigation of the optical properties of these materials followed. Dr. Lark-Horovitz found that the material with high conductivity in the very far infrared has much higher reflectivity than the material of high resistance. It also has a smaller transmission of infrared radiation.

Pure germanium and silicon metals have been prepared which transmit 50% of the infrared "light" beyond 2 microns in wavelength. The loss that occurs is primarily due to the reflections and not to absorption.

Filters as well as lenses will be made of these stable materials. Grinding the metals to dimensions will be easier than with softer materials now used, and Dr. Lark-Horovitz predicts that the new development will result in a wider investigation and use of infrared phenomena in the future.

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AERONAUTICS-ENGINEERING

Dual Turbo-Prop Engine

► TWO horsepower per pound of weight is developed by a new gas turbine engine for airplanes unveiled in Washington, D. C. It is of the type known as the turbo-prop, and is claimed to be the most powerful propeller-type engine ever cleared for flight.

The engine was developed for the U. S. Navy by the Allison Division of General Motors, Indianapolis. This company builds the widely used J35 turbo-jet engine which has acquired fame in speedy military fighter planes. The new engine is a different affair. The jet from its combustion chambers operates a turbine which in turn operates conventional propellers.

Turbo-props are already in use. Britain claims leadership in their development and application. The new engine is said to produce more power for its size and weight than any similar engine in the world.

Fuel economy is another feature of the new Allison turbo-prop. In this it exceeds that of recently revealed foreign engines. It matches the fuel economy of the best American reciprocating engines and produces twice as much power for each pound of weight. This XT40, as it is designated, rounds out the military requirement for an engine of the gas turbine

type which will transport payloads over long distances at high speeds and altitudes.

The XT40 is a completely new design which consists of two axial-flow gas turbine power sections driving a dual-rotation propeller through a common reduction gear. The power sections are connected together so that in effect they form a single unit. However, each power section may be operated independently.

This feature permits takeoff at full power with both power sections operating. In flight at reduced power for cruising speeds, maximum fuel economy can be obtained by cutting out one power section. The engine operates on the same fuel as used in ordinary turbo-jets. Four of them are now being installed in a Convair XP5Y flying boat for early flight.

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ENGINEERING

Windowless Textile Mills Aid Air-Conditioning

► MODERN textile mills should be built without windows and the roof should be insulated from sun heat, the American So-

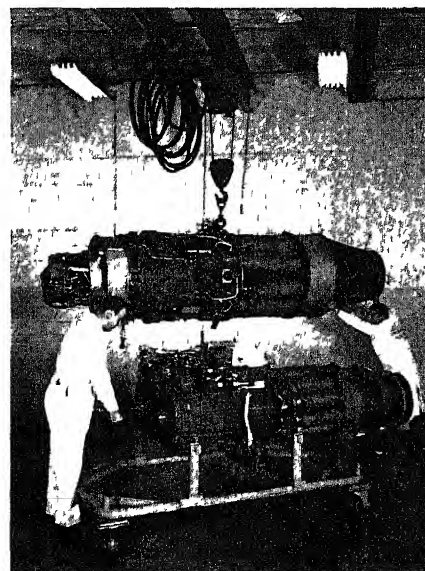
cietty of Mechanical Engineers was told by P. L. Davidson, consulting engineer of Philadelphia. Both steps are required to maintain the air within at proper temperatures and humidity for good weaving, he indicated.

From a functional point of view, windows have only two excuses for existing, he stated. These are for light and ventilation or cooling. Daylight construction fails to give the light required as measured by today's standards, and the volume of air required for cooling can not be obtained through open windows.

Proper air-conditioning in a textile mill is a number one requirement to proper processing of fiber. Temperature and humidity must be controlled. The strength of cotton fiber, he said, is approximately 50% greater, the elasticity 20% greater, and the strength before rupture more than double at 75% relative humidity than at 40%. Beyond a relative humidity of 75% the strength falls off and the elasticity increases rapidly, so windows which interfere with temperatures by drafts and humidity by condensation should be eliminated.

Air cleanliness is another essential in a textile mill. Electrostatic filters were recommended by Mr. Davidson to replace present inadequate air washers and oil and cloth filters. In these newer filters, foreign matter in the air is given a static charge as it passes through them and is removed by electrical attraction to electrically charged plates.

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TURBO-PROP ENGINE — The small size of the new Allison XT40 turbo-prop engine is compared here (foreground) with the J35 turbo-jet engine. This engine will first be used in the Navy XP5Y Convair flying boat.

GENERAL SCIENCE

STS Exams Are Held

Young scientists compete in science aptitude examinations. Forty top students will receive invitations to the Science Talent Institute.

► **'TEEN-AGE** scientists all over the United States sat down for some pre-Christmas writing on Dec 5

Their three-hour composition was no letter to Santa Claus but it will bring 40 of them the best Christmas present they ever had—an invitation to the five-day Science Talent Institute in Washington, D C and a chance to win a Westinghouse Science Scholarship

Some 16,000 boys and girls will be taking a three-hour science aptitude examination in their own public, private and parochial schools as the first step in the competition for the \$11,000 in Westinghouse Science Scholarships offered in the Ninth Annual Science Talent Search, conducted by Science Clubs of America, administered by Science Service

The high school seniors, all of whom aspire to careers in science, will also submit scholastic and other recommendations and a 1,000-word essay on the subject, "My Scientific Project" before the competition closes at midnight, Dec 27

The science aptitude examination, designed each year by Drs Harold A Edgerton and Stuart H Britt, New York psychologists, is planned to reveal ability to think and reason rather than to measure acquired knowledge of science

Only 40 boys and girls will be invited to the Ninth Annual Science Talent Institute in Washington, D C, March 2 through 6, 1950 For five days they will learn about new developments in science, listen to and talk with prominent scientists and be introduced to possibilities for their future in scientific research

During their five-day all-expense stay in Washington one of the young scientists

will receive the \$2,800 Westinghouse Grand Science Scholarship Runners-up will receive scholarships ranging from \$100 to \$2,000 The \$11,000 in scholarships will be awarded at the discretion of the judges Drs Edgerton and Britt; Dr Harlow Shapley, director, Harvard College Observatory, and Dr Rex E Buxton, Washington psychiatrist

The judges will name 260 other entrants in the Science Talent Search for Honorable Mention and Science Clubs of America will assist them as well as the 40 winners in getting scholarships at the colleges, universities and technical schools of their choice Previous Honorable Mentions have received valuable scholarships and other financial assistance in this way to continue their education

A double chance to win scholarships or other financial assistance for furthering their education in science is offered to high school seniors in 17 areas These boys and girls live in areas where State Science Talent Searches are in operation by special arrangement between Science Clubs of America and organizations of scientists and educators

By entering the national competition, the Ninth Annual Science Talent Search, students will automatically be entered in their State Science Talent Search in the following areas Alabama, District of Columbia, Georgia, Illinois, Indiana, Iowa, Louisiana, Minnesota, Montana, New England (open to students in all six New England states), Pennsylvania, South Dakota, Tennessee, Texas, Virginia, West Virginia and Wisconsin Write Science Clubs of America, 1719 N St, N W, Washington, D C for details

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below the surface of the earth the temperature might be about 500 degrees Fahrenheit, Mr Payne indicated The temperature gradients, he stated, vary for different localities However, abnormal temperatures amounting to 22 degrees Fahrenheit rise per 100 feet is considered the maximum which should be encountered

One operator, he added, states that the maximum temperature to be expected in 20,000-foot wells will approximate 400 degrees Fahrenheit If this is true, the present type of powders used in gun perforating probably can be used, however, speed of operation will be critical One service company, he revealed, feels that 350 degrees Fahrenheit is the maximum temperature for safe operation

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GENERAL SCIENCE

Shapley Elected Honorary Fellow by India Institute

► **DR HARLOW SHAPLEY**, director of Harvard Observatory, has been elected an Honorary Fellow of the National Institute of Sciences of India

Only four persons in the world besides Indians were so elected this year by the Institute, a non-governmental agency comparable to the National Academy of Sciences in the United States

Three Honorary Fellows elected from other countries were Prince Louis de Broglie, French physicist, Hans van Euler, Swedish chemist and George Tishler, German botanist

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Words in Science—EQUINOX-SOLSTICE

► **THE** equinox—you say it ee-kwi-noks, with the accent on ee—is the date on which the days and the nights are of equal length, and that occurs at the time the sun crosses the celestial equator

One of these dates, usually about March 21, is called the vernal equinox The other, about Sept. 22, is called the autumnal equinox Because there is often a severe storm in September at about that date, the storm has been called the equinoctial

The solstice is the point midway between the equinoxes At the summer solstice, usually about June 21, the days are longest At the winter solstice, about Dec 21, the days are shortest

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● RADIO

Saturday, December 17, 3 15 p m, EST

"Adventures in Science" with Watson Davis, director of Science Service, over Columbia Broadcasting System

Dr Perrin H Long, Professor of Preventive Medicine and Director of Department of Preventive Medicine of Johns Hopkins University, School of Medicine, Baltimore, Md, will talk about "New Treatments for Colds"

ENGINEERING

Deep Oil Drilling Needs

► **DRILLING** for oil to four-mile depths will require a lot of changes in drilling techniques and equipment, the American Petroleum Institute was told in Chicago by John M Payne, Shell Oil Company, Kilgore, Texas

He presented the findings of a study group on deep drilling, the study being under the auspices of the Houston chapter of the institute's division of production

Oil is now being produced from below 15,500 feet, he said, and it seems inevitable that the need for 20,000-foot commercial drilling will develop in the near future.

Deep drilling is an exact science for

which the equipment must be carefully engineered if it is to do a specific job

Although one rig has successfully drilled to more than 20,000 feet in one locality, drilling in different localities, as well as completing a well at that depth, may offer a large number of problems which as yet have not been solved The problems are technical, of course, and are concerned with matters ranging from the size of hole that must be drilled to equipment that can be used at the great depth.

Among the problems are those resulting from the high pressure and temperature encountered at 20,000-foot depths This far

MICROSCOPY

Microscope Has X-Ray Eyes

A microscope which utilizes X-rays has been developed. It may possibly rival the electron microscope in the future.

➤ A MICROSCOPE has now been given X-ray eyes to enable scientists to see very small internal details of living and non-living materials

Excellent results in first tests of the instrument were reported by Miss Charlys M. Lucht of the General Electric Research Laboratory, where it was made, at the meeting of the American Society for X-ray and Electron Diffraction in Philadelphia, Pa.

She predicted that the instrument may compete in the future with the electron microscope, which is the most powerful magnifying instrument now in use. Electron microscopes use a beam of electrons instead of light to form an image of materials under study.

With the X-ray microscope, X-rays are passed through the material being studied and then strike a pair of curved mirrors at an angle of less than one-half degree. The mirrors bend the X-ray beams in such a way as to cast a magnified X-ray image

of the sample on a photographic film.

The mirrors are platinum coated slabs of fused quartz which are as nearly flat surfaces as can be made. They are curved by mechanical pressure which can be adjusted by hand. This, Miss Lucht explained, makes it possible to change the curvature of the mirrors in order to improve focusing.

At present stage of development, magnifications of 100 diameters have been produced. X-ray images magnified 10 times are magnified another 10 times by photographic enlargement without serious loss of detail.

Objects studied so far have been fine mesh screens, selected for testing of the instrument's ability to show small details. Because the X-ray microscope, unlike the electron microscope, does not require samples under study to be in a high vacuum, it may make possible examinations of living materials at much higher magnifications than ever before.

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carrier-rate of salmonella infections is just as important in the community as typhoid and dysentery carrier-rates in older persons. It certainly should receive close consideration in any plan of prevention."

The carrier rate, they report in the LANCET (Nov 19), British Medical Journal is about 3.5%. In other words, between three and four of every 100 babies under two years in Brisbane is infected and a potential risk of epidemic spread.

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INVENTION

Xmas Tree Stand Clings To Floor by Suction

➤ WITH the Christmas season approaching, the government, at last, has issued an "in-season" patent. It is for a Christmas tree stand, a kind that clings to the floor by means of suction cups of rubber.

The main part of the stand is a metal plate which has a pocket on its lower side and projecting parts to drive into the stump of the tree on its upper face. Under it all, and fixed to the metal plate, is a sheet of flexible rubber fabric which is cupped into the pocket to form the "vacuum" to provide the suction to hold the tree from sliding around on the floor.

The device is designed also for use in securing a smoking stand or lamp stand to the floor or table. The inventor is Arthur D. Zedler, Yonkers, N. Y. The patent number is 2,489,845.

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MEDICINE

Salmonella Baby Threat

➤ SALMONELLA Baby may be a runner-up to Typhoid Mary as an unsuspected disease carrier and spreader of epidemics.

A warning of this possibility comes from Drs. I. M. Mackerras and V. M. Pask of the Queensland Institute of Medical Research at Brisbane, Australia.

The diseases or epidemics Salmonella Babies might spread would be stomach and intestinal upsets and possibly the diarrheal diseases that cause havoc in hospital nurseries and similar institutions. Salmonella, pronounced sal-mon-ella, is the family name for a large group of organisms including those that cause paratyphoid fever and those that cause food poisoning, or ptomaine poisoning as it once was called.

During an epidemic in Australia, Dr. Mackerras found that babies under two years continued to harbor the Salmonella germs up to six months after they had recovered from their acute attack of severe stomach and intestinal sickness. Infections in older children and grown-ups were mild or unapparent and generally transitory.

Drs. Mackerras and Pask followed up this finding by examining specimens from a continuous series of babies admitted to maternal and child welfare clinics. The babies were mostly "feeding problems." Some had had "bowel upsets" but most

were normal and none was sick enough to be sent to a hospital.

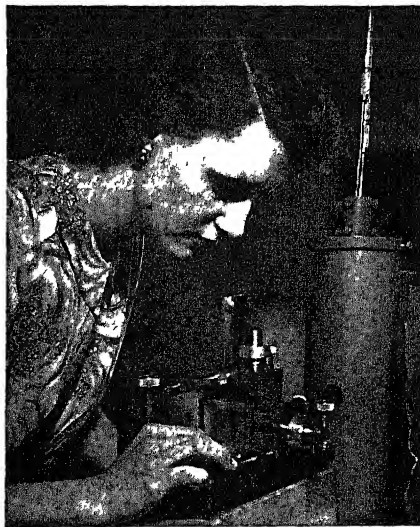
Sixteen strains of salmonella were found in 14 babies of this series. If the clinic records approximate a random sample of the child population of Brisbane at the time (19,000 children under two years of age), there would have been more than 600 salmonella infections scattered through the baby population of the city. Yet only 33 cases of sickness from salmonella were treated in hospitals during the survey period.

This suggests that the germs are normally harmless but that under certain conditions they can become virulent and cause sickness.

This state of affairs is probably general and of considerable significance in connection with epidemics, the doctors point out, "because infection may be widespread in a community but completely unsuspected and therefore not attacked."

"There is in fact a permanent potential epidemic risk and it is easy to understand," the doctors state, "how epidemics often arise when children are crowded together under conditions which favor spread from child to child."

"We feel," they state, "that this infant



X-RAY MICROSCOPE—Miss Charlys M. Lucht, of the General Electric Research Laboratory, demonstrates an experimental X-ray microscope. The microscope makes it possible to examine directly minute details of internal structure in materials through which light cannot pass.

PSYCHIATRY

Birthdays Remembered Under Hypnosis

➤ CAN you remember on which day of the week your birthday fell when you were four years old, or seven or 10?

Probably not, but if you were successfully hypnotized by a psychiatrist, you probably could.

More than 40 of a group of 50 persons, 10 women and 40 men, were, when hypnotized, able to recall correctly the days of the week for their birthdays and for Christmas when they were four, seven and 10 years old, Dr Robert M True, of the University of Vermont College of Medicine, reports in the scientific journal, *SCIENCE* (Dec 2).

An extremely small percentage gave the correct answers to any of these questions before hypnotic induction, he reports. The percentage was so small that when correct answers were given it was probably by chance.

Dr True's study was done to develop a simple, practical test to tell the psychiatrist whether a patient being psychoanalyzed under hypnosis has really gone back to his early childhood and is telling what happened then and reliving those experiences, or whether he is telling and acting out experiences in his current memory.

For the psychiatrist to have a method of distinguishing between a real childhood state under hypnosis and a half-pretended one is important, Dr True points out, because recall of actual hurtful experiences is more beneficial in treating a neurosis than the reliving of an imagined experience.

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DENTISTRY

Brush That Sweet Tooth To Avoid Decay

➤ IF you have a sweet tooth, and want to satisfy it, use toothbrush and mouth rinse immediately afterwards to avoid tooth decay. Better use toothbrush and mouth wash after any meal.

This advice, bringing the fight on caries full circle back to the clean tooth idea, comes from studies by Drs H W Haggard and Leon A Greenberg of Yale University.

These scientists are physiologists, not dentists. They take the view that if sugar is a cause of tooth decay, regardless of the mechanism by which it affects teeth, the magnitude of its effect will be related to the concentration of sugar in the mouth and particularly to how long it stays there.

A caramel and orange juice, they found, both brought the sugar content of the saliva up to almost the same high point of 800 mg per 100 cc. But 20 minutes after the orange juice, there was almost no sugar left from it in the saliva, whereas 45 minutes after the caramel, there was still considerable sugar left from it.

-Thoroughly brushing and washing teeth

and mouth after eating the caramel, however, immediately brought the sugar concentration in the saliva to the zero baseline.

Trying to avoid tooth decay by avoiding sugar, the Yale scientists point out, is impractical, because almost all starch food-stuffs produce sugar in the mouth, and micro-organisms involved in tooth decay make no distinction as to the source of the sugar.

A mixed meal, for example, brought the sugar concentration in the saliva to more than 600 mg per 100 cc, and it took 45 minutes before the sugar had dropped to the point reached 20 minutes after the orange juice.

Their tests, reported in the *DENTAL SURVEY*, were made at five, 10, 20, 30 and 45-minute intervals after eating each of the following: a mixed meal, fresh orange juice, grapefruit juice, ice cream, crackers, chewing gum, caramel candy and sweetened bottled soft drinks.

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ENGINEERING-AERONAUTICS

Fire-Resistant Hydraulic Fluid Is Approved

➤ THE need for a fireproof fluid for use in aircraft hydraulic mechanism to operate landing gear and other parts will be met, in part at least, by a new fire-resistant synthetic liquid that the Civil Aeronautics Administration has now approved for use in certain planes.

This new hydraulic fluid, known as Skydrol, is a joint development of Monsanto Chemical Company, St. Louis, and Douglas Aircraft Company of Santa Monica, Calif. Its approval is for use in DC-4 and DC-6 transport planes. Later approval is expected for other planes, Monsanto officials state.

The hydraulic system of a modern plane by means of which controls and flaps and other parts are operated from the pilot's cabin includes much tubing leading to various sections of the plane, as well as pumps and valves. The pressure in the tubes may be as high as 3,000 pounds per square inch. If a leak should develop in the system, the hydraulic fluid would escape into near and far-away places in the plane. If combustible, it would then be a fire hazard. It would be an extreme hazard in a plane crash.

A hydraulic fluid requires a unique combination of chemical and physical properties. It must be a suitable lubricant for the pumps. It must be non-corrosive to avoid attacking the various metals in the system. It must not undergo undue thickening at low temperature and thinning at high temperature. It has to be light in weight to avoid adding undue weight to the plane. In addition, it should be highly fire-resistant. Skydrol is claimed to meet all these specifications.

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ENGINEERING

First Coal-Burning Gas Turbine To Be Tested

➤ AMERICA'S first coal-burning gas turbine locomotive will be ready for testing before the end of the year, it was revealed by Dr John T Rettaliata of the Illinois Institute of Technology. It is being built by the Allis-Chalmers Manufacturing Company.

An American gas turbine locomotive using oil for fuel has been in use since early summer. Several coal-burning gas turbines are under development. Coal is a highly desirable fuel for locomotives because it is plentiful and well distributed for railroad use. Present coal-burning steam locomotives are on the way out, being replaced by the more efficient diesel. But diesels use oil for fuel.

This Allis-Chalmers coal-burning gas turbine locomotive, like the oil-burner in use and like most of the diesel locomotives, uses the prime power to develop electricity for the driving power. As described by Dr Rettaliata, in the new locomotive air from the atmosphere is compressed and passed through a combustion chamber where its temperature is raised to about 1,300 degrees Fahrenheit by the burning of pulverized coal. It enters the turbine in the form of a hot gas. By expansion of the gas through it, the turbine develops power both for the compressor and the electrical generator.

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POPULATION

Birth Rate Is Third High in 25 Years

➤ IF you think almost every young couple you know had a baby this year, you are not far off. During the first nine months of the year, births of 2,669,000 babies were registered, the National Office of Vital Statistics estimates on the basis of figures now available.

This gives an estimated birth rate for the first nine months of 24.1 per 1,000 population, which would mean, in round numbers, one baby for every 20 couples if every 1,000 population were made up of 500 couples. Actually, the per 1,000 population figure includes some children and old people.

The birth rate this year is almost the same as for the corresponding period of 1948, which was 24.2, the second highest for the January-September period in over a quarter of a century.

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BIOCHEMISTRY

Radioactive Ground Moles Help Fight Against Polio

➤ RADIOACTIVE ground moles will help fight infantile paralysis and cows will, perhaps contentedly, swallow radio sulfur to show scientists more about milk protein synthesis

These are among research programs utilizing radioactive materials from the Atomic Energy Commission's pile at Oak Ridge, Tenn. The physical research division of Eli Lilly Company at Indianapolis, Ind., hopes to tag the ground moles with radiocobalt to find out where they burrow, the distances they travel and other habits. If the moles can be tagged and more learned about them, they may become useful animals for infantile paralysis research since they will live in their natural state and not under laboratory conditions.

Radiosulfur-fed cows are expected to tell scientists at Lankenau Hospital Research Institute, Philadelphia, and the Borden Company Laboratory, Scarsdale, N. Y., to what extent sulfur-containing amino acids for protein in milk are formed in the rumen, or first stomach of the cow.

Science News Letter, December 10, 1949

MEDICINE

Oxygen Lack Reduces Radiation Cell Damage

➤ X-RAY damage to the hereditary cells of plants, similar to that which atomic radiation causes, can be greatly diminished by eliminating the surrounding oxygen, say two Oak Ridge scientists, Drs. Norman H. Giles, Jr., and Herbert Parkes Riley.

These findings, while not directly applicable to humans, have possibly important implications for medical research.

In an attempt to confirm recent reports of an oxygen-radiation damage relationship, the two biologists subjected the plant *Tradescantia* to X-ray bombardment while it was in different mediums, namely oxygen, nitrogen, and air. They found that changes in the chromosomes, seat of the genes which control heredity in plants, animals and humans, were greatest when the plant was in oxygen and least when it was in nitrogen.

To make sure that it was not the gases which were causing the "chromosomal rearrangements" they placed plants in each of the mediums without applying X-rays. They found that the gases alone did not produce the effect.

In all tests with X-rays they found that absence of oxygen lessened cell damage. Besides nitrogen, they tested the plants in helium and argon. Each time the damage

was less than when the plants were X-rayed while in oxygen.

Drs. Giles and Riley, reporting their findings in the PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES (Nov.), do not know whether the oxygen affects the actual chromosome breakage or the later recovery process.

Another government scientist who commented on their report, tentatively favors the theory that the absence of oxygen slows down the movement of the chromosomes. This, he believes, aids the repair of X-ray breaks, while the presence of oxygen permits and perhaps speeds up cell movement, thus preventing breakage repair.

He pointed out that if this is the case the discovery would not be of much immediate application in preventing human chromosome damage in the event of an atomic burst, because in the absence of oxygen a man would soon die.

He suggested, however, that other methods may be devised to slow down cell division, such as low temperature or chemicals. He stressed that this was still highly conjectural, but that such problems would probably be solved eventually by research in atomic medicine.

Science News Letter, December 10, 1949

MATHEMATICS-ENGINEERING

Giant Brains Are Explained in New Book

➤ ADD "cybernetics" to your modern vocabulary. It is a new coined word which applies to the science of control and communication in the animal and the machine. The term is used by the scientists who developed the giant electronic and mechanical computers that are now solving problems in seconds that would require many months with pencil and paper.

These machines are complicated affairs, well beyond the understanding of the ordinary human. A popular explanation, however, is now available. It is in a new book just published, *GIANT BRAINS, OR MACHINES THAT THINK* (John Wiley and Sons, Inc.). The author is Edmund C. Berkeley, an authority on the subject.

There are several of these computers now in use in the country, and more under development. They include Harvard's Mark I, II and III; the differential analyzer at the Massachusetts Institute of Technology, the Bell Telephone Relay Calculators, the so-called ENIAC developed at the University of Pennsylvania, and BINAC built by Eckert-Mauchly Corporation, Philadelphia. One of the newest is the BEMAC, built by Boeing Airplane Company, Seattle, Wash., and used to determine how a guided missile will behave on an imaginary flight in the air without even being shot into the air at all.

While the new book is entitled *GIANT BRAINS*, the computers are not brains at all. They do no thinking. With the use of hundreds of electronic tubes, electric relays and special mechanisms, they fol-

low instructions fed into them in electric code to find the answers of problems, also fed into them in code. They are unlike the punch-card machinery used by hundreds of businesses today. They use reels of magnetic tape coded in a language of their own. They are machines that handle "huge quantities of information automatically."

Science News Letter, December 10, 1949

AERONAUTICS

Nitrogen Tetroxide Is a Top Rocket Aid

➤ A LONG known but little used chemical, nitrogen tetroxide, promises to become a number one aid in rocket propulsion, the American Rocket Society was told by Douglas H. Ross of Allied Chemical and Dye Corporation, New York.

Nitrogen tetroxide is not a fuel. It is an oxidizer to provide the necessary oxygen for combustion. It is a chemical of high oxygen content. It is about 70% oxygen and it is capable of releasing the entire amount under such rigorous conditions as encountered in a rocket motor.

It is a chemical easily made from ammonia. It can be produced in abundant quantities. Some 500,000 tons annually could be made in the United States if only 10% of the present ammonia output were converted to nitrogen tetroxide.

Rockets, unlike all other types of jet-propulsion, can operate miles above the earth where there is not enough oxygen in the air to support combustion. It carries its own oxygen, either mixed with the fuel or in separate containers to mix in the combustion chamber. Finding an efficient oxidizer is as important as finding an efficient fuel.

Nitrogen tetroxide, Mr. Ross stated, has high chemical stability, high density, low freezing point, and little susceptibility to decomposition.

Science News Letter, December 10, 1949

MEDICINE

Warning Issued Against Anti-Histaminics Use

➤ A WARNING against "indiscriminate use" of the anti-histaminic substances now available at drug stores in anti-cold pills has been issued by the American Medical Association.

The A.M.A. is not convinced that there is enough evidence yet to warrant the claims being made on anti-histaminics for colds. Also, A.M.A. records show that about one-third of those taking these drugs become drowsy or fall asleep at work.

Possibility of harm when the drugs are taken over long periods and of people taking too much in case of persistent colds are other points made.

Science News Letter, December 10, 1949

METALLURGY

Trick Metals to Improve Steel

The monocrystalline structure of certain metals used in research gives them unique properties. Yet due to atomic flaws these single crystal metals are very weak.

By J. G. FEINBERG

See Front Cover

➤ **SILVER** rods which bend like lead, but cannot be unbent. Metal wires which can be pulled out as easily as a piece of taffy—once, but not a second time.

Those are the sort of trick metals to be found in the laboratory of Prof. E. N. daC. Andrade, world authority on metallurgy, at London's University College, who will soon become director of the Royal Institution.

The rods that bend and wires that stretch are single crystals several inches in length. By contrast, the ordinary piece of metal is made up of a myriad of microscopic crystals. They are polycrystalline. The monocrystalline structure of Prof. Andrade's metals gives them their unique properties.

Of what practical value is this work with forms of metals which exist only in specialized laboratories? The ultimate practical gains may be great, says Prof. Andrade. It is well known that even the toughest steel our steel-makers can turn out of their furnaces today is only 1/40th as strong as it theoretically could be. There are theoretical possibilities of vastly increased strength of materials.

"Where so many of the dreams of inventors are clearly impossible on simple grounds of energy and such-like fundamental considerations, gigantic advances are here, at any rate, not inherently ruled out," Prof. Andrade declares.

Unusual Characteristics

These single crystals of metals possess unusual and unexpected characteristics. On the basis of theoretical calculations, it was expected that single crystal metals would be much stronger and tougher than the ordinary polycrystalline forms. Prof. Andrade was amazed, therefore, to find that they were softer and much less resistant to stress.

A one-half inch single crystal wire can be stretched by pulls of, depending on the metal, between two and 20 pounds. A child could stretch the softer of the metals.

But, once the wire is pulled, or the rod bent, the metal undergoes a strange toughening. A single crystal copper wire can easily be pulled to twice its original length, but having reached this maximum length, it then takes 80 times as much force to stretch it any farther. X-ray analysis indicates that the reason for this is that

stretching destroys the single crystal structure of the metal. The length to which one of these trick metals can be drawn is shown on cover, contrasted with an undrawn single crystal.

Another unusual characteristic of single crystal metals is that, regardless of the direction of the pull, they insist on stretching in directions of their own choice. Nor does the wire stretch uniformly. Rather it elongates in spurts along certain very definite planes. In scientific language, mono-crystalline wires are said to have definite glide-directions and glide-planes.

The result of these innate predilections is, on stretching, a peculiar flattening of the wire, accompanied by curious steplike ridges, as if the crystal had slipped in layers. These steps are called slip-bands and can clearly be seen with the naked eye. The distance between the bands varies with the different metals and with the temperature. Sometimes a single crystal will exhibit several slip planes at angles to each other and frequently twinning occurs, with two sets of bands which are mirror images of each other.

Twinning Occurs

Twinning is a phenomenon which is not yet clearly understood, but for the other

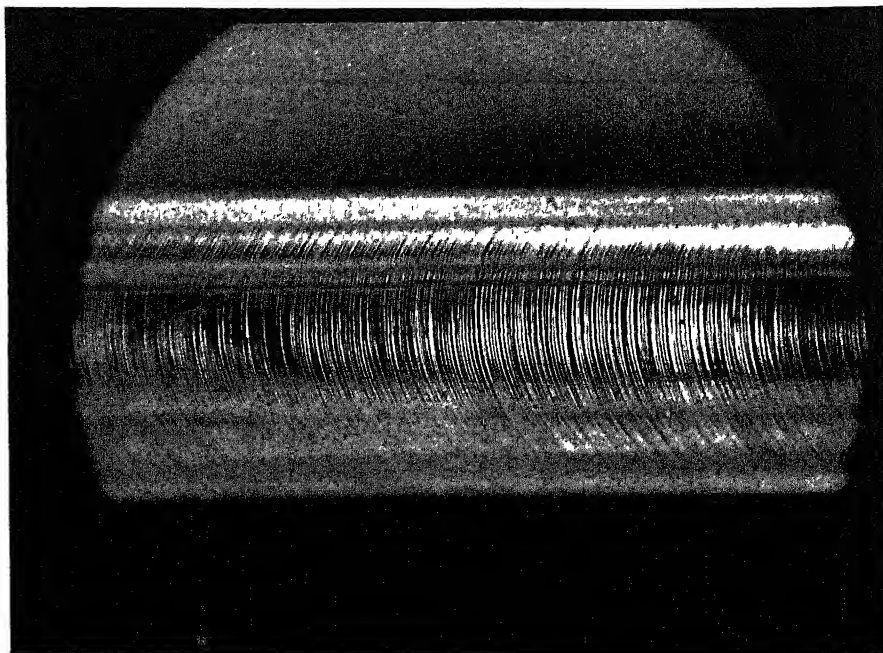
peculiarities of single crystal metals Prof. Andrade has reasonable explanations based on his own experimental work and deduced by analogy from the behavior of other substances.

The softness and gliding properties of his single crystal wires Prof. Andrade explains on the basis of imperfections in the surface layers of atoms, to ultra-microscopic "cracks" in the atomic "skin" of the crystal. Thus, a coating of oxide only 20 atoms thick will increase by 50% the force required to stretch a 0.5 millimeter wire, while thicker films will double the stress required. Also, bombarding a wire with alpha particles (hearts of helium atoms) while it is stretching very much increases the rate of flow of single crystal cadmium in the early stages, when fresh glide planes are being formed. Since the alpha particles have practically no penetrating power, this can only be a surface effect.

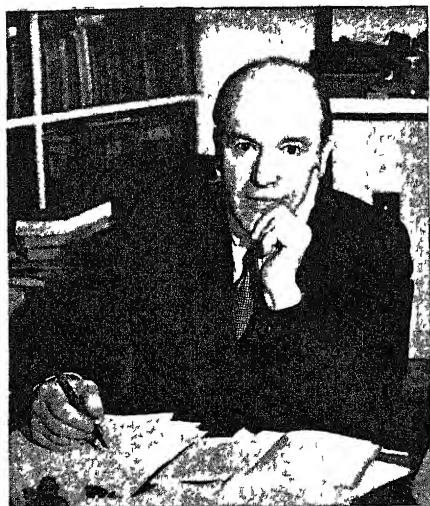
Surface Has Defects

It is possible that internal flaws may play a part, admits Prof. Andrade, but he feels that "surface defects are the only ones whose effect has so far been definitely proved in the case of metals."

Analogous deductions can be made from the experimental weakness of non-metals like glass, quartz and rock salt as compared with their theoretical strengths. In each of these cases it has been shown that the weakness lies in minute cracks in their surfaces, cracks which can be made visible



STRETCHED SINGLE CRYSTAL—The slip bands in a solid mercury single crystal which has been stretched are pictured.



METALLURGY AUTHORITY—
Prof. E. N. daC. Andrade prepares
papers which tell of his research with
single crystal metals.

by exposing them to sodium vapor. In the case of sheet mica, the surface of which is remarkably free of flaws except at the very edges, it has been shown that the strength of such sheets is ten times greater when the stress is kept solely on the perfect surface than when it extends to the imperfect edges.

Making Crystals

To make his single crystals, Prof. Andrade encloses an ordinary wire of many crystals in a glass tube in which it fits loosely and from which all the air has been evacuated. He then runs a traveling furnace slowly, at about the rate of half or an inch an hour, over the tube. The wire melts locally and then re-solidifies as the furnace moves along, resulting in a single crystal. In the case of metals with melting points higher than that of glass, Prof. Andrade employs molds made of carbon.

The first specimens ever seen of the single crystal forms of some metals were prepared by Prof. Andrade as long ago as 1913. Since then he has devoted his energies to their study. So interesting and novel were the properties of single crystal metals that between the wars they were studied extensively by scientists in England, Russia and Germany, but for some reason the subject has not attracted American investigators.

Atomic Flaws Weaken Crystals

One lesson learned from the study of the single crystals is that, because of atomic flaws, the individual metal crystals are exceedingly weak. The greater strength of every day metals lies in their haphazard polycrystalline structure, with the glide-planes and glide-directions of the crystals oriented at random. Thus each crystal is hemmed in by other crystals which will not readily give in the same direction or

plane in which it gives most easily. This is much like the principle of the girder, in which the planes of several sheets of metal are fixed at right angles to each other.

Prof. Andrade believes his experimental results point two tasks for the practical metallurgist:

- 1 To see if the atomic flaws in metal surfaces can be eliminated
- 2 If not, to see how the polycrystalline nature of metals can be increased

Science News Letter, December 10, 1949

ENGINEERING

Electric Discharge Prints Instrument Chart Paper

➤ CHART paper for use particularly with commercial facsimile telegraphy, but usable in many types of recording instruments, has a coating of electrosensitive material which is "printed" by an electric current passing to it from a simple wire stylus.

The new paper, dubbed Teledeltos, was developed by the Western Union Telegraph Company and was revealed at the annual meeting of the Society for Experimental Stress Analysis by Grosvenor Hotchkiss of the company. It meets the requirement in facsimile recording by being instantaneous, dry and permanent. The coated paper is light grey in color. The current flowing through it produces a black mark.

In previous facsimile transmission, the record was made photographically by a beam of light on photo-sensitive paper. Facsimile is a system, now coming into wider usage, in which an entire printed page, letter, message or photograph is sent by radio waves or through wire connections from a transmitter to distant receivers. In the transmitter, the copy is rapidly scanned by a beam of light that passes over it in successive lines, each close to the one above. The reflected light, varying with the variations in the markings on the surface being scanned, operates a photo-electric cell from which varying electrical energy is emitted.

At the receiving end, the process is in reverse. The electrical energy causes variation in the beam of light from a photo-electric cell. The varying intensity of the

light reproduces an exact copy of the original on sensitized paper. With this new paper, the record made requires no finishing or fixing. The paper is usable for automatic train position recorders, recording chronographs and galvanometers, wave pattern recorders and other instruments.

Science News Letter, December 10, 1949

NUTRITION

Dairy Products Improved By Ion-Exchange Milk

➤ SMOOTHER ice cream, improved quality of baked goods and improvements of various other dairy products by the use of ion-exchange milk are foreseen by Dr. C. W. Gehrke of the University of Missouri at Columbia, Mo., and Dr. E. F. Almy, of Ohio State University at Columbus.

Ion-exchange milk is milk that has been modified by the use of certain artificial resinous materials. Reporting on their joint researches at Ohio State University in the scientific journal, *SCIENCE* (Nov. 25), Drs. Gehrke and Almy state that these materials seem to "offer a variety of possibilities for modifying the mineral components of milk," either by removing ions, such as calcium, or substituting other ions for those normally present or by both operations.

Science News Letter, December 10, 1949

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MEDICINE

Sponge Aids Cancer Fight

➤ A NEW aid in the fight against cancer has been developed by Dr. Sidney A. Gladstone of New York Polyclinic Hospital and Medical School.

It consists in a method for getting material for cancer detection in the early stages of the disease before it shows signs or symptoms that either patient or doctor notice.

All the doctor does is to rub a tiny piece of a gelatine sponge over the surface of the area that might be cancerous. The sponge absorbs fluids, cells and tissue particles. The sponge and its absorbed contents are then fixed in formalin, embedded in paraffin and cut by a microtome into very thin slices. The slices are then stained and on examination by a trained pathologist reveal the presence of cancer, if the patient has cancer.

The fixing, staining and other treatment of the sponge are essentially the same as in the procedure for cancer diagnosis, called biopsy, in which a tiny piece of suspected cancer is cut out for microscopic examination.

The sponge method is not only simpler but has the great advantage of picking up

cancer cells from surfaces that look so normal the doctor does not suspect the need for punching or cutting out a bit of tissue for examination.

In one case, for example, a 48-year-old woman's "vague complaints" were thought due to the glandular changes of middle age. The sponge biopsy of the womb was made in the course of examination, although no abnormalities were seen. The sponge biopsy revealed the presence of cancer, which was confirmed at operation, although a surgical biopsy missed the cancer.

Cancer of the skin, vocal cords, bronchi, esophagus, rectum and stomach can also be diagnosed in early stages by this method. Dr. Gladstone pointed out in a report to the *NEW ENGLAND JOURNAL OF MEDICINE* (July 14).

Because the sponge must be able to withstand the dissolving action of alcohol, chloroform, acetone or other fluids used in preparing the material for microscopic examination, Dr. Gladstone has worked chiefly with a sponge called gelfoam, manufactured by the Upjohn Company.

Science News Letter, December 10, 1949

PSYCHIATRY-DENTISTRY

Caries-Neurosis Link

➤ TOOTH DECAY and a neurotic personality seem to go together.

Doctors and dentists have for some time assumed that mental and emotional factors might affect the teeth, just as these factors play a part in stomach ulcers, colitis, asthma and other bodily disorders.

Now statistical evidence for the relation between personality and tooth health has been obtained.

A Bernreuter personality inventory, said to be the "best and most valid test of its kind to measure traits of personality as divorced from intelligence," was given to 50 men and women, faculty members, students and employees of Tufts College Dental School.

The same 50 also were scored as to the number of decayed, missing and filled teeth.

When the two scores were compared, they showed that all but four of those with the least neurotic tendencies had a DMF tooth score of less than 40, while all but five of those above the lowest levels of neurotic tendencies on the personality score had a DMF tooth score above 40.

The data have statistical significance with less than one percent possibility that the results are due to chance. Dr. John H. Manhold and Vivian W. Manhold who made the studies at Tufts report in the scientific journal, *SCIENCE* (Dec. 2).

Science News Letter, December 10, 1949

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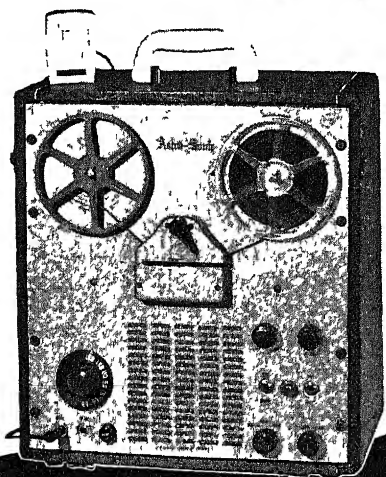
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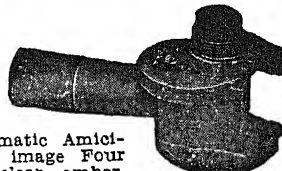
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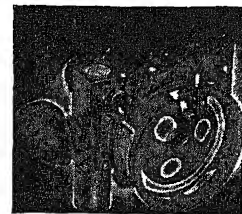
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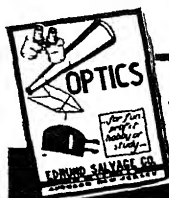
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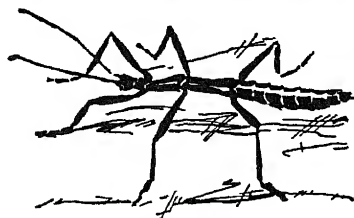
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ENTOMOLOGY

NATURE RAMBLINGS



Walking Stick

➤ THIS strange insect is designed with such a close resemblance to a twig that as long as it remains immobile, it stands an excellent chance of escaping detection. But if you keep your eyes peeled in the country, if you suddenly see a stick walking, its probably a walking stick.

Now that the frost has come you are likelier to see some of the queerer creatures of the insect kingdom, sluggishly dragging

themselves about in the relative warmth of noon. This time just before the deep snows is a good time for observing walking sticks.

The common walking stick of the United States is related to many similar insects, many of which abound in the tropics. One characteristic that this family of insects shares is the remarkable imitation which each species has managed to achieve of the twigs of its local environment. Some of the tropic varieties especially so cleverly mimic the appearance of their surrounding leafy vegetation that trained observers are frequently fooled.

It is remarkable that an insect which blends so perfectly with its environment as to seem to be immune from all predators, does not become so abundant as to be a pest. This may be because there is only one generation per year, and the number of eggs laid by each female is about one hundred. Compared to most other insects, notoriously fertile and prolific, this is very restrained rate of reproduction.

Like the grasshoppers to which they are closely related, walking sticks are vegetarians. Their color changes with the season, being green during the summer, turning to gray and brown later in the year. This change in color is actually part of the maturing process of the insect. The young hatch out about May. At this stage

they are a pale green. They molt twice without change of color. As they develop into mature insects their color changes to the darker hue, more suitable to the color of fall vegetation.

The walking stick's manner of laying eggs is in keeping with its camouflaged appearance. Instead of fastening them to a leaf or depositing a heap of them in some natural recess somewhere, the female drops her eggs on the ground. These eggs, like the parents, are cleverly imitative also. They look like seeds of some plant, and they are scattered about loosely on the surface of the ground.

Where an egg falls, next spring there will probably hatch out a young walking stick. The egg is the winter hiding place for the developing, hibernating insect. By spring the brand new walking stick is ready to emerge. The warm spring sun signals to it. It pushes on the top of the shell. And lo, it lifts up like the top of a hinged box. And another walking stick steps forth, to live out its harmless summer, and to leave deceptive seedlike eggs on the ground, its bid for immortality.

Science News Letter, December 10, 1949

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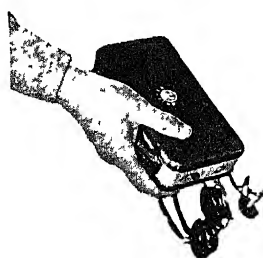
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Books of the Week

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AIRCRAFT MAINTENANCE AND SERVICE—R H Drake—*Macmillan*, 352 p, illus, \$6 00 Step-by-step procedure for airplane mechanics, students and laymen. All the information necessary to qualify for mechanics certificate.

ALCOHOL AND HUMAN AFFAIRS—Willard B Spalding and John R Montague—*World Book*, 248 p, illus, \$1 64 Discusses the chemical history and effect of alcohol, compares religious attitudes toward it, and suggests what can be done to help alcoholics.

CAUSES OF INDUSTRIAL PEACE UNDER COLLECTIVE BARGAINING—Clark Kerr and George Halverson—*National Planning Association*, Case study No 6, 87 p, illus, \$1 00 A case study of the no-strike relationship between Lockheed Aircraft Corporation of Burbank, California, and Lodge 727 of the International Association of Machinists.

COCIDIOSIS—Sterling Brackett and others—*New York Academy of Sciences*, 623 p, illus, paper, \$3 00 A monograph including reports from investigators in the field which will help to point the direction for future studies.

COMMUNITY HEALTH—L B Chenoweth and W R Morrison—*Appleton*, 31d ed, 314 p, illus, \$3 00 An elementary hygiene text completely revised. Former editions were published under the title of *Community Hygiene*.

ENERGY AND MATTER—R L Worrall—*Staples Press*, 144 p, \$2 00 Energy and matter examined in their historical setting. In non-technical language.

FLUID PRESSURE MECHANISMS—H G Conway—*Pitman*, 218 p, illus, \$5 00 The author deals with hydraulic, pneumatic, and compressed gas systems of high, medium, and sometimes low pressure.

GLOSS ITS DEFINITION AND MEASUREMENT—V G W Harrison—*Chemical Publishing Company*, 145 p, illus, \$4 00 A critical study of the literature.

GOETHE AS A SCIENTIST—Rudolf Magnus—*Schuman*, 259 p, \$3 50 A biography of the great poet based upon his scientific interests and achievements.

HALF-HOURS WITH GREAT SCIENTISTS The Story of Physics—Charles G Fraser—*Rein-*

hold, 527 p, illus, \$6 00 Short biographies of the men who gave valuable contributions to the field of physics. Valuable illustrations.

HEREDITY EAST AND WEST Lysenko and World Science—Julian Huxley—*Schuman*, 246 p, \$3 00 The author explores the scientific, social, and political aspects of the Mendelism versus Lysenkoism controversy. Another volume in the Life of Science Library.

I DID NOT INTERVIEW THE DEAD—David P Boder—*University of Illinois Press*, 220 p, \$3 50 Verbatim transcriptions of the narratives of eight displaced persons interviewed by a psychologist.

INDUSTRIAL MICROBIOLOGY—Samuel Cate Prescott and Cecil Gordon Dunn—*McGraw-Hill*, 2nd ed, 923 p, illus, \$8 50 Thoroughly revised with special emphasis on methods of cultivating the organisms, on production media and methods, and on literature references.

INTRODUCTORY BOTANY—Alexander Nelson—*Chronica Botanica*, 479 p, illus, \$3 75 An introductory text. Morphology and anatomy are stressed by the Scottish author.

AN INTRODUCTION TO MOLECULAR SPECTRA—R C Johnson—*Pitman*, 296 p, illus, \$7 50 A textbook for the graduate or approaching graduate in chemistry or physics.

MEAT AND MEAT FOODS Processing and Preservation from Meat Plant to Consumer—Lloyd B Jensen—*Ronald*, 218 p, illus, \$3 75 Introductory text on meat technology or microbiology of meats. Written in non-technical language.

OUTLINES OF FOOD TECHNOLOGY—Harry W von Loesecke—*Reinhold*, 2nd ed, 585 p, illus, \$7 50 A college textbook.

RADIO-FREQUENCY HEATING EQUIPMENT—L L Langton—*Pitman*, 196 p, illus, \$3 75. Discusses the design of equipment and also presents some applications of the technique. The reader is expected to have some previous knowledge of electrical or radio engineering.

A SHORT HISTORY OF CHINESE ART—Hugo Munsterberg—*Philosophical Lib*, 227 p, illus, \$5 00 Traces the history of Chinese art from prehistoric times to the Manchu

Dynasty against the panorama of Chinese history and culture. It is designed for the interested layman as well as the college student.

THE STATE OF FOOD AND AGRICULTURE A SURVEY OF WORLD CONDITIONS AND PROSPECTS—Food and Agriculture Organization—*United Nations*, 138 p, paper, \$1 50 Economic and nutritional levels are compared. Includes prospects for 1950-1951.

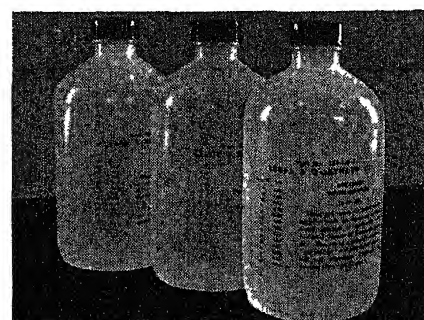
TRANSACTIONS OF THE WISCONSIN ACADEMY OF SCIENCES ARTS, AND LETTERS Vol 39—Banner Bill Morgan and others—*Wisconsin Academy of Sciences*, 247 p, paper, \$4 00 Compilation of articles covering aspects of the biological, physical, and social science fields by specialists. This volume includes the years 1947, 1948, and 1949.

VEGETABLE GUMS AND RESINS—F N Howes—*Chronica Botanica*, 188 p, illus, \$5 00 A book on gums and resins from the plant science point of view, including natural laquers, medicinal resins and little known gums.

VITAMIN E—Karl E Mason, Director—*New York Academy of Sciences*, 427 p, illus, paper, \$4 50 A monograph compiling much information on this vitamin and its varied aspects.

YOUR NASAL SINUSES AND THEIR DISORDERS—Albert P Seltzer—*Froben*, 155 p, illus, \$2 50 Intended to provide reliable information for those who insist on self-diagnosis and to suggest measures to prevent actual cases of sinus infection.

Science News Letter, December 10, 1949



New buffer solutions for calibrating pH Instruments

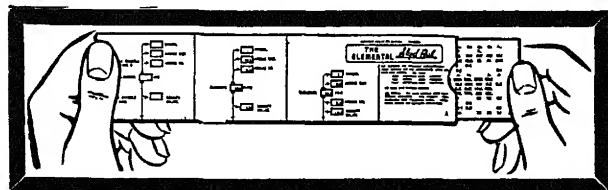
A new line of buffers for calibrating any pH instrument is now available. Made, and checked after bottling, to NBS specifications, nominal pH values are 4, 7, and 9. Actual values at 25 C are 4.01, 6.86, and 9.16. Actual values in 5-deg steps from 0 to 60 C are printed on the 1-pt unbreakable, non-contaminating polyethylene bottles. Printing in 3 colors aids in lab identification, red denotes acid, black, neutral, and blue, alkaline buffers.

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• New Machines and Gadgets •

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❁ **CHRISTMAS TREE**, table size, is made entirely of a mesh-like aluminum foil and is light, inexpensive and fireproof. In tree form, it glows with a soft inner light transmitted on hundreds of mirror-like strands from an electrically lighted base. Expanded foil, supplied by a manufacturer of air filters, is used in it.

Science News Letter, December 10, 1949

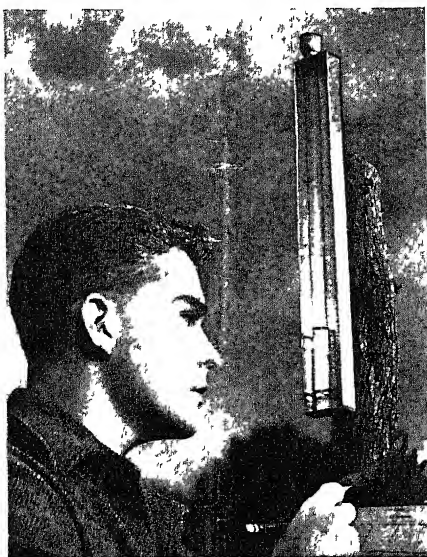
❁ **RUBBER SPRINGS**, to take the jerks and bumps out of riding a tractor, operate on a torsional shear principle and are used in pairs horizontally placed under the seat. They consist of a thick layer of special rubber sandwiched between and fastened to two metal plates.

Science News Letter, December 10, 1949

❁ **FLATIRON HOLDER**, for a hot electric iron, has a metal base, which is fastened to but spaced away from a wall, on which are side flanges with space between them for an inserted iron point-end down.

Science News Letter, December 10, 1949

❁ **RAIN GAGE**, shown in the picture, is a simple but accurate type, made of transparent shatter-proof plastic, designed particularly for farmers, gardeners, home owners and amateur meteorologists. The



graduated tube, easily read, can be removed from the metal holding frame for emptying.

Science News Letter, December 10, 1949

❁ **CARBURETOR PREHEATER** is claimed to be able to overcome sluggish starting of the automobile engine in cold

weather. Designed for easy installation between carburetor and intake manifold, the unit consists of an electrical heating element held by two terminals in a plastic gasket.

Science News Letter, December 10, 1949

❁ **WIRE CUTTER FOR DENTISTS**, for use in straightening teeth and the closing of broken jaws, is made of stainless steel with edges of hard carbide metal. The cemented carbide cutting edges, being far harder than any other metal, keep in sharp condition and make wire cutting easy.

Science News Letter, December 10, 1949

❁ **PLASTIC PIPING**, one-twelfth the weight of steel tubing, is being used to draw off salt water from crude oil deposits. It is made of a cellulose acetate butyrate plastic and, in addition to being light in weight, is non-corrosive, flexible and strong.

Science News Letter, December 10, 1949

❁ **STEREOSCOPE**, a small-sized plastic type for youngsters in the fairy-story stage, comes with ten stories in color, each composed of ten slides containing double pictures to give the three-dimensional effect. Familiar stories, such as "Jack and the Beanstalk," are included.

Science News Letter, December 10, 1949



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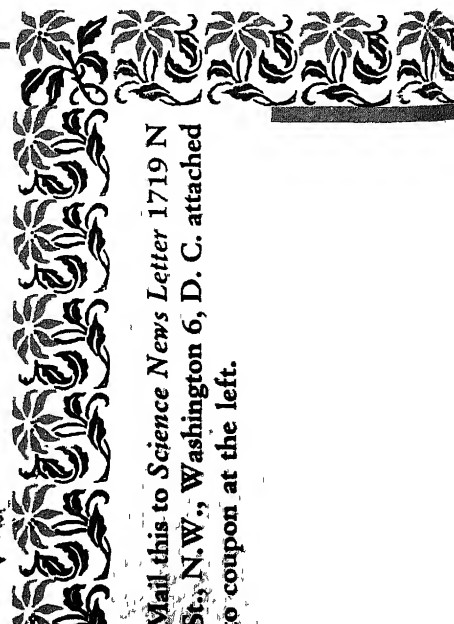
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DECEMBER 17, 1949

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



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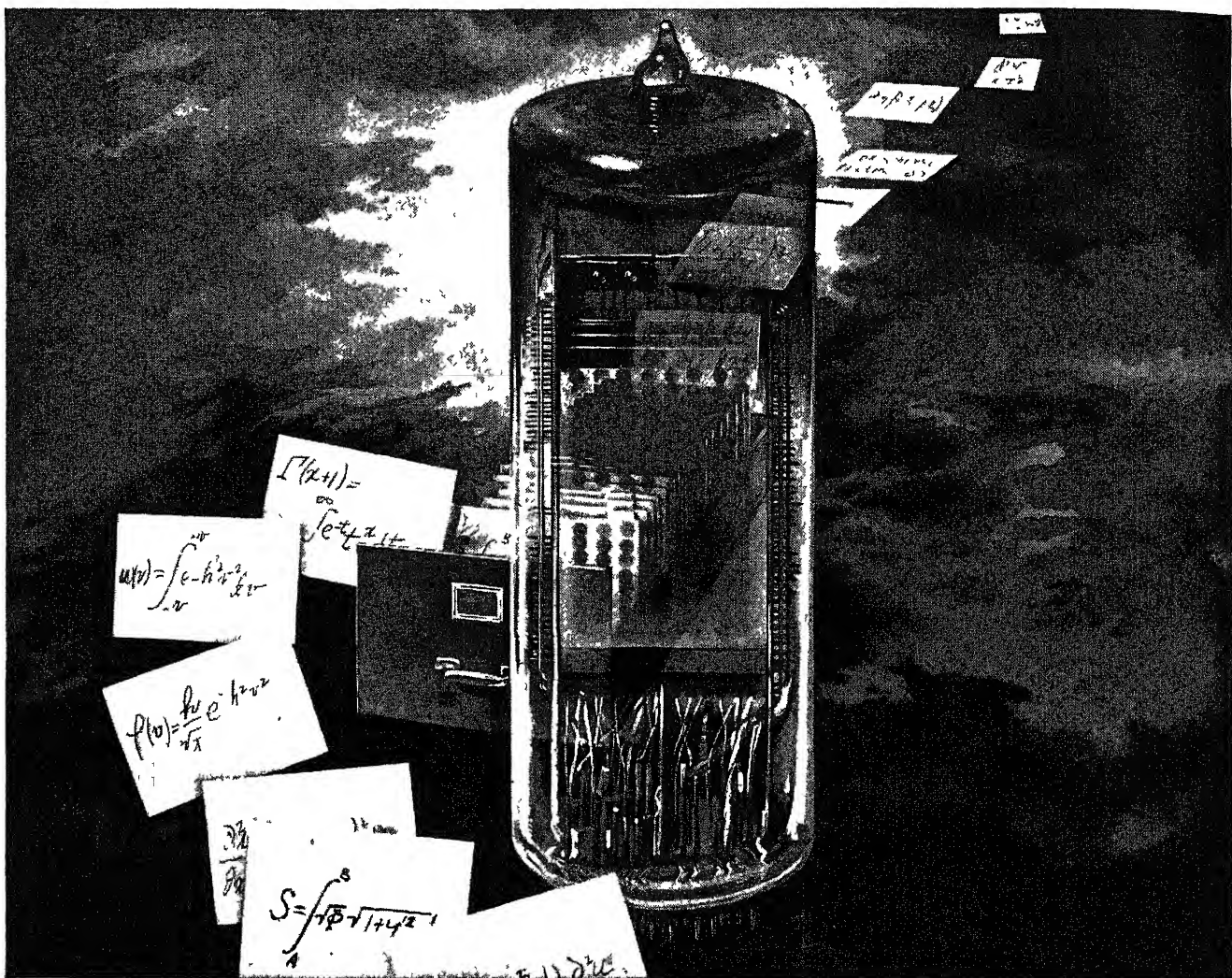
Winter Wonderland

See Page 390

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VOL. 36 NO. 25 PAGES 383-400



New RCA electron tube gives today's amazing computing machines an indispensable memory.

Tube with a memory keeps answers on file

So complex are present scientific studies—such as in atomic research—that just working out the “arithmetic” could easily take up all of our scientists’ time.

Short cut through this drudgery is found in huge electronic computers, able to add or multiply numbers as large as a thousand billion in *millionths* of a second. But such speed is valueless unless—with comparable speed—the results of countless computations can be kept “on file” and taken out again.

Such a “file” now exists in the Selectron tube, developed at RCA Laboratories. Electronically it retains figures fed into calculating machines, stores them while it memorizes new ones—speeds intelligent solutions through mazes of mathematics.

Uses of RCA’s Selectron tube are many. It will help atomic scientists acquire new and needed knowledge provide new information on supersonic flight . . . even help make rapid weather predictions! It is an invaluable instrument in the scientist’s campaign to penetrate the unknown.

For your benefit:

Development of the Selectron tube is another of the basic advances pioneered at RCA Laboratories. Continued leadership in science and engineering adds *value beyond price* to any product or service of RCA and RCA Victor.

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PHYSICS

Earth's Current Balanced

Thunderstorms supply the necessary reverse current to keep a charge of electricity amounting to 1500 amperes on the earth.

➤ ONE of science's major puzzles, what keeps a charge of electricity on the earth, has been solved, Dr Vannevar Bush announced in his annual presidential report of the Carnegie Institution of Washington in Washington, D C

The thousands of thunderstorms active at any instant all over the earth counter-balance the current of 1500 amperes that has long been known to be dissipating from all the fair-weather areas of the earth

Proof that the thunderstorms supply the necessary reserve current was obtained by extensive researches by the Carnegie Institution's Department of Terrestrial Magnetism since the end of the war More than 20 years ago the suggestion that this was the cause was made in England But it took many hours of flight at record heights by cooperating U S Air Force planes to prove the theory The clear air high above the flashing thunderheads showed that the electric current between the upper atmosphere and the earth is reversed in sign to fair-weather current and stronger in intensity

A new hint that the continents of the earth may have drifted from some earlier arrangement to their present pattern is contained in other research reported by Dr Bush Rocks in the Blue Ridge mountains of Virginia have been magnetized, Carnegie Institution scientists found, as though they had been originally laid down in South Africa Possibly the magnetic north has been unstable through the long period of geologic time or there have been large-scale magnetic disturbances from electric current systems inside the molten earth But another possibility is that the earth's crust has actually moved, a hypothesis that has been suggested in the past because of the way that the continents, now widely separated by oceans, fit into each other

How the compass pointed more than 350,000,000 years ago is being discovered by studies of rocks laid down in ancient seas in past geologic times The little particles of the rocks are found to line up like compass needles, telling the field of the earth in these ancient times The investigations have been extended this past year to sandstones in Maryland and Virginia which have been folded and contorted by mountain building When the geophysicists laid out the rock samples the way they must have been before the structural changes occurred, the particles were oriented as they should have been by magnetism Such fossil magnetism shows that the compass direction in those ancient millennia

was quite different from what it is now

Yeasts and algae can become sources of the protein and fats that the world must have to support larger population, Dr Bush declared in telling of controlled experiments on *Chlorella* algae cultures Given generous supplies of carbon dioxide, these

plant growths double themselves every day and can be made to yield varying portions of fat or protein depending upon the conditions under which they are grown

New knowledge of the heredity of corn showed that a bearer of heredity, called a gene locus, may control several reactions within the organism, some of which may have several biological effects

In another research the chromosomes that carry the genes or units of heredity were dissected with biological preparations to determine their structure This showed that no single protein or nucleic acid may be considered the basic structural component of the chromosome

Science News Letter, December 17, 1949

ENGINEERING

Better Cake and Bread

➤ YOUR cake and bread may taste better soon because of a new method for drying the flour you use

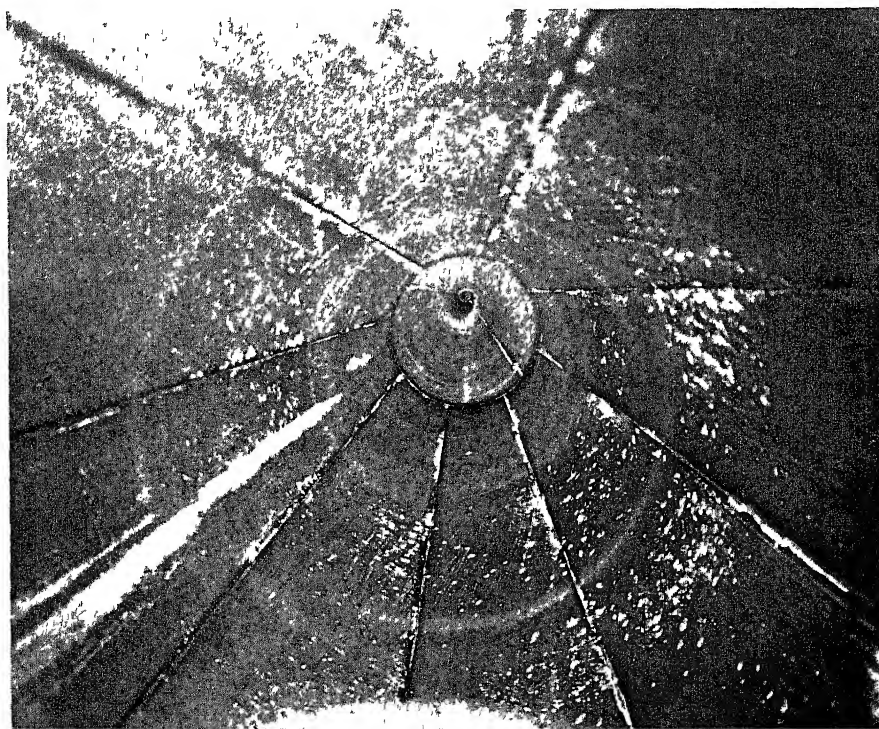
Flash-drying reduces the amount of water normally found in flour, about 14% With moisture reduced as low as desired, flour can now be stored for long periods of time without spoiling Bacteria and fungi are attracted to moist flour

This low-moisture flour will be especially valuable to the Armed Forces It will also be used in cake mixes The process

was developed at the Industrial Research Institute, University of Denver.

"Of course, you can get low-moisture flour by drying it in an oven," explains Prof Dent C Davis, chemical engineer and supervisor of the research project "But flour dried this way doesn't have any good baking properties When heated to 170 degrees Fahrenheit or more, there is a damaging change"

With the flash-drying process, Prof Davis stated, the water is "flashed" or



"FLASH-DRIED" FLOUR—Swirling with centrifugal force from the top towards the bottom of the giant cone, flour particles are "flash-dried" in two seconds.

rapidly vaporized from the flour in a few seconds. During this time there is no change in the flour.

The flour is dried in a stainless steel structure shaped like a mammoth ice cream cone. Air, heated to a controlled temperature, is passed through a fan opening diagonally into the top of the cone, which is six feet in diameter. Just as the air reaches the opening to the cone, flour is mixed with it.

The mixture is then whirled around the

inside of the cone. In two to ten seconds, the flour drops through a hole at the bottom, having lost from 50% to 90% of its former moisture.

The air can be heated as high as 300 degrees Fahrenheit for this drying. The flour particles, however, reach no more than half that temperature. Evaporating water keeps the particles relatively cool in the few seconds that they revolve through the cone.

Science News Letter, December 17, 1949

is the largest producer of magnesium and is generally credited with developing this method of combatting corrosion.

Science News Letter, December 17, 1949

● RADIO

Saturday, December 24, 1949, 3 15 p m, EST

"Adventures in Science" with Watson Davis, director of Science Service, over Columbia Broadcasting System.

Dr. Howard A. Meyerhoff, administrative secretary for the American Association for the Advancement of Science, will talk on "Preview of National Science Meetings."

ENGINEERING

Ship Corrosion Prevented

➤ CITING possible savings of up to \$75,000,000, the United States Maritime Commission will ask Congress next year to authorize installation of a new method of preventing the hulls of the nation's 2,200 merchant ships in reserve from rusting away. Experiments just about completed have shown the Commission that corrosion of the outside metal plates below the water line can be halted merely by hanging small magnesium metal plates all around each ship.

Maritime Commission officials figure the system would cost \$25,000,000 over a 20-year period. Heretofore the only way to save a ship from permanent damage through corrosion was to haul it into a drydock periodically and sandblast and paint its bottom. Cost of this method of saving the merchant vessels would run up to \$100,000,000, commission officials say. If the magnesium plates were used, there would be no need to drydock ships until they were needed for service.

The magnesium plates halt corrosion by acting as anodes to the cathodes of the steel in the ship's bottom. The water acts as an electrolyte. Thus a primary cell is formed and an electric current flows from the magnesium to the ship. The current causes

slight decomposition of the film of water in contact with the ship's hull, thus arresting corrosion.

Maritime officials estimate that it would take only 39 men, each working one year, to install the magnesium anodes around each ship and that maintenance would be simple and inexpensive. The plates would be changed every three years.

This method doesn't prevent barnacles from gathering on ship bottoms but Commission experts point out that the ships would have to go into drydock before being put back into service anyway and the bottoms could be scraped clean then.

The Navy at present prefers the more expensive method of hauling ships out of water periodically, scraping their bottoms and applying anti-corrosion and anti-barnacle paint. The Department points out it is trying to keep the fighting vessels in such a state of readiness that it should not be necessary to send them to drydocks before putting them back into service.

At present, magnesium producing facilities in this country far exceed demand. Several plants built by the government during the war—magnesium is used in planes and incendiary bombs—are now idle. The Dow Chemical Company, Midland, Mich.,

SCIENCE NEWS LETTER

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ASTRONOMY

Star Measures Distances

An artificial star is helping in the development of a more precise measuring stick of stellar distances. The lamp will aid in the determination of the color of stars.

➤ AN artificial star, carried from one mountain peak to another and observed as though it were a star in the distant heavens, is playing a leading role in a project to develop a more precise yardstick for measuring stellar distances.

The "star" is a tungsten filament lamp. It is enclosed in a box, in which a small hole has been drilled to allow the right amount of light to escape. When it is placed on a peak 1,000 to 3,000 feet from the University of California's Lick Observatory it looks like Betelgeuse or Arcturus, which are among the brightest of stars.

Developers of the artificial star are Dr. Joel Stebbins, the founder of photoelectric photometry and recently retired as director of the University of Wisconsin's Washburn Observatory, and Dr. Gerald Kron, associate astronomer in the observatory at Mt. Hamilton, Calif.

They hope their lamp will enable them to perfect the system of determining the colors of stars, a system used by astronomers to determine the absolute magnitudes of stars and their distances from the earth. Now that the 200-inch telescope at Palomar is searching deeper into space, where magnitudes are increasingly difficult to determine, improvement of the system is a matter of growing importance.

The two scientists, after making some preliminary observations, have sent their lamp to the Bureau of Standards for precise calibration of its temperature, which is approximately 3,700 degrees Fahrenheit. This is in the temperature range of red

stars, such as Betelgeuse, which has a temperature of 3,000 degrees.

After the "star" has been calibrated, photoelectric observations of it with one of the observatory's telescopes will permit a determination of just how red the lamp is. Then when they observe real stars which fall in precisely the same place in the spectrum, they will know they have the same temperature and color as the lamp.

Then it will be possible to tell how far away the stars are and their distances from the earth and absolute magnitude. Distances and magnitudes are determined by the colors of the stars, the color being determined by temperature. Blue stars are the hottest and brightest, white stars come next, and red stars are faintest.

When the temperature is known, astronomers can tell how much light a star is giving off. Then the amount of light actually received in the telescope is determined. Knowing how much light is lost traveling a given distance through space, it becomes possible to determine how far away the star is.

Dr. Stebbins and Kron hope to use their artificial star as a starting point of a scale which can be used for stars of all temperatures. Such a scale would permit the calculation of stellar distances with greater precision than has been possible previously.

The project which Dr. Stebbins is heading is sponsored by the Office of Naval Research and assisted by grants from the American Philosophical Society.

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self is a stellar system similar to the thousands of nebulae.

Further studies will be made to determine if such clustering is the exception or the rule in distribution of nebulae. The results may explain much about the construction and origin of the universe.

The clouds of interstellar particles were found when the scientists attempted to count nebulae in some parts of the sky. No nebulae were to be found in some places, indicating that visibility was blocked by clouds of particles detached from the Milky Way and floating in space. Such clouds long have been known to occupy space between stars of the Milky Way.

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MEDICINE

Rotation Treatment Saving Cancer Patients

➤ SOME patients with cancers too far advanced to be helped by surgery can be saved by a rotation treatment, Dr. Theodore R. Miller of Memorial Cancer Center, New York, declared at the meeting of the American Cancer Society in New York.

Rotation treatment is done by rotating the patient during X-ray treatment, while the X-ray beam is kept pinpointed on the cancer. As a result, the cancer gets much more of the destructive X-rays than the surrounding normal tissues. Dr. Jens Nielsen, Copenhagen, Denmark, developed this method.

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"X-RAY SPECTROGONIOMETER"—Dr. David Harker of the General Electric Research Laboratory studies a record of an unknown chemical sample, drawn automatically by the machine on which his hand rests. The machine makes it possible to determine in a few minutes the chemical content and arrangement of atoms in a chemical sample.

ASTRONOMY

Large Galaxy Clouds Found

➤ NEW information about the distribution of "island universes" in space and the discovery of clouds of interstellar particles drifting in space have been reported by astronomers at the University of California's Lick Observatory.

The results were reported from a detailed study of three regions of space by Dr. C. D. Shane, director of the Observatory, and C. A. Wirtanen, observer.

The astronomers found two great clouds of galaxies, or extra-galactic nebulae, larger than any heretofore known. The discovery of these galaxies may lead to a new concept of the distribution of such "island universes."

On the basis of the work of Dr. Edwin Hubble, of Mt. Wilson and Palomar Ob-

servatories, it has been supposed that the nebulae are distributed at random in space. The Lick astronomers confirmed that this holds true if the whole sky is considered without attention to detail.

However, the picture is different if sections of the sky are examined in detail. In two of the three regions examined some of the nebulae were concentrated in two great clouds, with sub-centers in which the nebulae were extremely dense. In the third region the distribution was random.

The largest of the two clusters contains more than 1,000 nebulae, is over 60 million light years away, and extends over a distance of 10 million light years. For purposes of comparison, the solar system is a minute part of the Milky Way, which it-

ASTRONOMY

Moon Craters Change

➤ UNMISTAKABLE changes in two lunar craters were detected following the eclipse of the moon of Oct 6, it was learned in Albuquerque, N Mex. Walter Haas, staff astronomer of the University of New Mexico's Institute of Meteoritics, observed the changes in the craters Eratosthenes and Grimaldi on the night of the eclipse. A total of four areas of the moon were examined during the eclipse for possible alterations.

The changes in Eratosthenes consisted in the definite lightening of a dark area of about 15 square miles on the crater floor. The change persisted several hours after totality ended. The affected area had been matched with a neighboring spot on the crater floor several months before the eclipse, the last check observation being taken only 15 hours before the end of totality. In all the pre-eclipse comparisons the two areas were of equal intensity.

Two bright spots on the outer west wall of the equatorial crater Grimaldi provided the second example of eclipse-induced changes. The night before the eclipse the southern spot was observed to be definitely brighter than the northern one. The next night Grimaldi emerged from the umbra at 8.41 p.m., MST, and at 8.48 the northern spot was considerably the brighter of the two. This greater brightness of the normally-dimmer spot persisted until after 10.50

p.m. At 12.11 a.m. on Oct 7 the southern spot had regained equal brilliance with its neighbor, and by 12.54 a.m. it was finally, again, definitely the brighter.

The changes observed by Mr. Haas in Grimaldi were partially confirmed by E. E. Hare in Owensboro, Ky., and by C. B. Stephenson, of the University of Chicago. Mr. Stephenson had also reported similar changes in Grimaldi during the April, 1949, eclipse of the moon.

Eratosthenes has frequently been suspected of changes following eclipses, but the observations made in October are probably the most satisfactory yet to be obtained, for the degree of contrast left little doubt that actual changes had occurred.

The nature of such changes is quite debatable. Mr. Haas points out that most areas of the moon are unaffected by the sudden cold and darkness of an eclipse, and that most of the changes which do occur are very slight, requiring considerable care and experience to detect. Furthermore, the same lunar object may be affected differently at different eclipses. Nevertheless, with all variables weighed, evidence increasingly points to definite physical or chemical changes caused in the lunar crust by eclipses.

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PSYCHIATRY-DERMATOLOGY

"All-Over" Itching May Spell Family Resentment

➤ ELECTROSHOCK treatment might be good medicine for patients who complain of itching all over, Dr. Frank E. Cormia of New York City suggested at the meeting of the American Academy of Dermatology and Syphilology in Chicago, Ill.

Such patients, and others who suffer intense itching or burning sensations in just one or two spots, are unconsciously harboring feelings of resentment or hatred toward a close relative or toward their work, which may be unsuitable for them.

In a study of 300 patients, Dr. Cormia found that more than half, 57%, had severe disturbances in their family situations. Maladjustments in early life affected 77% and long standing conflicts in adult life affected as many as 87%.

Abnormal strictness of parents, family strife, sexual difficulties and unsuitable work actually caused the severe itching and skin disturbances, Dr. Cormia said.

Successful treatment of these patients was difficult because of the considerable amount of time required for analysis of each individual's problems.

Measures designed to block the progress

of harmful nervous impulses to the skin, by injections of nerve-blocking drugs, were of little value and in some cases were actually harmful.

Although some 30% of the total group were cured and another 27% greatly improved by sympathetic reassurance, understanding of their problems and help in recognizing their conflicts and reconstructing their attitudes, the poor results in many patients led Dr. Cormia to suggest trying electroshock treatment in future for such patients.

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ENGINEERING

Gas Turbines for Autos Present Many Advantages

➤ GAS turbines for automobiles, which hold many advantages over present reciprocal engines, were predicted for the relatively near future at the meeting of the American Society of Mechanical Engineers at Erie, Pa., by Prof. Frank L. Schwartz of the University of Michigan, Ann Arbor.

In the United States, several companies have already built small gas turbine engines designed for use in automobiles. Two automotive gas turbines in England have been under development for several years, he said. Czechoslovakia is reported to have an-

nounced the development of an automobile propelled by a gas turbine having from 60 to 80 horsepower. It is said that it will operate on naphtha, coal gas, hydrogen, acetylene, butane or gasoline.

Advantages of the gas turbine as an automobile power plant listed by Prof. Schwartz include smaller and lighter than present engines, fewer moving parts, low oil consumption, no need of antifreeze, smooth operation, elimination of automatic transmissions, and the ability to use low-grade fuels, that is, fuels that do not require a high degree of refining.

Gas turbines can effect a 50% saving in engine weight, he stated. It gives about seven times as much exhaust gas, but the gas is cooler than from the reciprocating engine. The hot gas flowing from the rear of a gas-turbine-propelled vehicle is no different from that of the conventional automobile.

There are many problems to be solved before the gas turbine becomes a practical machine that is competitive with the reciprocating engine for vehicle propulsion, he added. Progress to date on gas turbines does not indicate that these problems can not receive adequate solutions.

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Words In Science— MALLEABLE-DUCTILE

➤ THE two terms, malleable and ductile, both refer to the workability of metals.

Malleable is derived from the Latin word *malleus*, meaning a hammer. It is applied to a metal that can be hammered into shape. Pure gold is the most malleable metal known, it can be beaten out into leaf only 1/300,000 of an inch thick.

The word ductile is also from the Latin, from the verb *duco*, which means to lead. It was also from this verb the former Italian dictator took his title, "Il Duce."

Ductile is applied to a metal that can be drawn out into wires. Wires are made by forcing the metal through a series of holes of diminishing diameters in some harder metal or substance. These are called dies. Copper is quite ductile and is easily drawn out. Steel is harder, but it is still made into wires by using a larger number of dies so that each one makes only a small reduction in diameter. Tungsten is very hard, so that a great many diamond dies have to be used.

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On This Week's Cover

➤ ERMINE-CLAD mountain hemlocks in Crater Lake National Park bend under their coats of snow. Serene in their splendor, they have been spared the axe of Yule tree hunters.

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MEDICINE

New ACTH, Cortisone Use

ACTH and cortisone are now being used to treat depressed patients due to their stimulative effect observed in the treatment of arthritic patients.

➤ A FEW patients with depressions are now getting the 1949 arthritis wonder drugs, ACTH and cortisone. This was revealed by Dr. Edward F. Rosenberg of Michael Reese Hospital, Chicago, at the meeting of the American Medical Association in Washington, D. C.

Reason for trying these drugs on depressed patients, he explained, is that when given to rheumatoid arthritis sufferers, the drugs not only banish the arthritis symptoms but have a marked stimulating effect on the patient's mood.

A patient who gets a dose in the afternoon will be busily straightening up her room, rearranging clothing in closets and the like when the doctor comes for his evening visit, Dr. Rosenberg said. The effect is slightly more than a feeling of well being.

Trial of the drugs on depressed patients, Dr. Rosenberg stated, is being made by a psychiatrist, Dr. Roy Grinker of Chicago. Dr. Rosenberg himself is an arthritis specialist, and has used the drugs for arthritis patients.

Results with both drugs have been identical, he said, so far as relieving the arthritis is concerned. ACTH, the gland product from hog pituitaries which stimulates the adrenal glands, has a few more disadvantages than cortisone, in his opinion. One disadvantage is that the supply is more

limited. Because ACTH is a very complex protein chemical, the chances of its being made synthetically are almost non-existent. ACTH also, in Dr. Rosenberg's experience, produces slightly more side effects, such as acne and swelling from water retention.

Cortisone is a hormone produced by the adrenal glands and has been synthesized, but supplies of this also are very limited because the synthesis must start from an animal product, bile acids, and the synthesis is complex and has a very small yield.

Six chemicals related to cortisone, called steroids, have been tested by Dr. Rosenberg and associates. None of them has proved effective in rheumatoid arthritis.

Rheumatic fever may yield to cortisone, but it will be a generation before doctors can tell positively about this.

Neither chemical is effective in osteoarthritis, Dr. Rosenberg stated.

The nation's 2,000,000 arthritis patients and their doctors, he warned, should not sit around waiting for cortisone to become plentiful. Rheumatoid arthritis patients can be helped by methods known and used before the discovery of cortisone. Delay in starting these other forms of treatment, he warned, may result in permanent deformities.

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MEDICINE

New Syphilis Treatment

➤ A NEW treatment for syphilis has been discovered. It is chloromycetin, originally obtained from a germ found in Venezuelan earth.

The sores of early syphilis start healing within 24 hours after treatment with this drug is started, four doctors from George Washington University School of Medicine report in the scientific journal, *SCIENCE* (Dec. 9).

This is the first report of success with this drug in treating syphilis in humans, although another group of scientists had reported it effective in experimental syphilis in rabbits.

The George Washington University scientists who tried it in human syphilis patients are Drs. Monroe J. Romansky, Sidney Olansky, S. Ross Taggart and Eugene D. Robin.

After trying various dosages, they found the best scheme was to give the patients six equal doses by mouth every four hours

for six to eight days. In most patients the sores were completely healed at the end of treatment.

A more effective means of controlling syphilis may now be possible, Dr. Romansky pointed out, by using chloromycetin in combination with other antibiotic drugs, such as penicillin.

Trial of chloromycetin in late stages of syphilis is now under way.

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PHYSICS

Geiger Counter Tubes are Protected by Canning

➤ ALTHOUGH a can opener still will not be standard equipment for an atomic physicist, nevertheless he can now get his Geiger counters in a can.

The can, similar to that used for tennis balls, is said to give extra protection to the

sensitive tubes that are used to detect radioactivity. The tubes are wrapped in cotton batting before being sealed.

It is claimed by Tracerlab, the concern for which the American Can Company designed the tennis-type can, that the container protects the thin mica windows of the tubes from the stresses due to changes in atmospheric pressure during air shipment.

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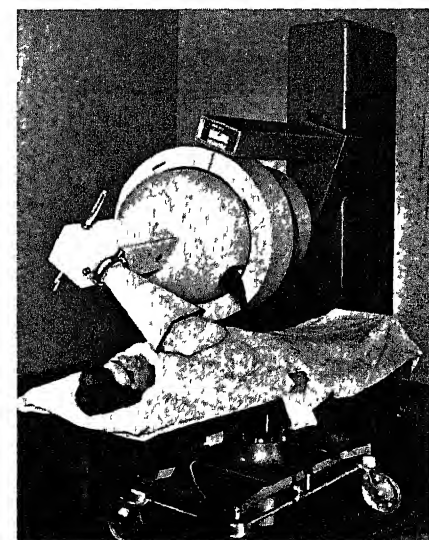
MEDICINE

X-Ray Machine Treats Twice as Many Patients

➤ TWICE as many cancer, leukemia and other patients per day can be given X-ray treatments as formerly was possible with a new machine announced by the General Electric X-Ray Corporation at the meeting of the Radiological Society of North America.

The machine can deliver X-rays at voltages from 100,000 to 250,000, said to be the widest range of radiation ever produced by a single treatment unit. This wide range and the machine's "phenomenal intensity" are due to use of a beryllium "window" in the tube. Because beryllium is more transparent than glass to the passage of X-rays, the new machine can, if desired, be made to deliver nearly twice the number of roentgens per minute that are produced by earlier tubes in its class. (A roentgen is the unit of measure of radiation.)

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MAXITRON 250—The "three-in-one" therapy X-ray machine demonstrates treatment to the breast. The bolus bag scatters secondary radiation back into the part of the body being treated.

MINERALOGY

Are Gold and Silver On the Silvery Moon?

➤ GOLD and silver have been found in a tektite, which is a small glassy stone believed by some to be a chip off the moon. Billiton, the island in the Java Sea where the tektite was picked up, has no gold or silver of its own.

In the single specimen reported, the quantity of the precious metals was very small. However, the presence of even a small quantity, in a stone of presumed lunar origin, suggests that there may be gold and silver on the moon, says Jack De Ment, research chemist, in the MINERALOGIST MAGAZINE (Dec.) published in Portland, Oreg.

Tektites have baffled scientists for many years. Their glazed appearance and the fact that they are found in a broad belt girdling the central region of the earth, have been explained in a variety of ways. The latest theory, not accepted by all authorities, was advanced by Dr. H. H. Nininger in 1946. Dr. Nininger believes that tektites result when fast-moving meteorites crash into the moon's surface, causing molten bits of matter to fly into space. Chips flung with sufficient force and in the right direction come within the earth's gravitation pull, and fall to earth.

The Billiton tektite that yielded evidence of gold and silver, was studied by Baron R. J. de Touche Skadding. It was subjected to spectroscopic analysis by Drs. R. H. Bell and A. C. Hawkins of New York.

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MEDICINE

Study Diabetics Under 25 For Artery Hardening

➤ YOUNG diabetics under the age of 25 are the ones in whom doctors should study the problem of hardening of the arteries, or arteriosclerosis as doctors term it.

This reversal of the idea of the artery disease being an ailment of middle age and old people comes from the distinguished authority on diabetes, Dr. Elliott P. Joslin of Boston.

In diabetics, the artery condition starts early and in one group of patients killed more than half before the age of 25, Dr. Joslin stated at the meeting of the American Medical Association in Washington, D. C.

The average length of life for diabetics of all ages is 14 years and five months from the onset of the disease. This is three times what it was 50 years ago and can be doubled in the next 50 years without any new discoveries, Dr. Joslin said.

Of a group of 50 patients whose diabetes started in 1925, 30 are still alive and "going strong," he said. Two of them had tuberculosis but recovered from it and are now

holding jobs. One developed cancer of the intestines, was operated on and is still living. Not one of them has developed gangrene, which is one of the dreaded complications of diabetes that is not controlled by proper treatment.

Four more diabetics have just been added to the 10 who have already received gold medals for having followed doctor's instructions so carefully that they have lived with diabetes for 25 years without developing any signs of degenerative disease that could be detected by X-rays, doctor's examination or eye examination.

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PHYSICS

Sound Waves Are Industry And Laboratory Tools

➤ SOUND waves too rapid to affect the human ear as sound are being used by chemists and engineers in a great variety of applications ranging from examining steel for flaws to assisting chemical reactions.

Ultrasonics is the name applied to these high-pitch sound waves. It is possible to shoot them through 30 feet of steel and find a small flaw, the American Institute of Chemical Engineers was told by Dr. Dudley Thompson, Virginia Polytechnic Institute, Blacksburg, Va. Among chemical applications, they are employed in the emulsification of various liquids, mercury and water, and of molten metals and water.

In the perfume industry, ultrasonic emulsification is used to avoid the use of organic solvents that might be harmful to the skin. Improved fuel for automobiles and other internal combustion engines may come by emulsifying small quantities of water and water solvents in hydrocarbons by means of ultrasonic waves. Easy ignition or anti-detonating properties would be promoted, it is thought.

In addition to detecting flaws in metals, measuring the thickness of metal sheets, and in chemical processes including emulsification, the use of ultrasonics in submarine signaling and submarine detection was suggested by Dr. Thompson.

It is suggested, he said, that the phenomenon of ultrasonic signaling might be applied in a manner analogous to the photo-electric cell. It is indicated, he stated, that a change in the physical properties or the nature of the liquid would cause a change in an ultrasonic signal passed through the liquid.

The desire to perfect a method for applying ultrasonics to submarine detection has resulted in much investigation in this country and abroad during the past three decades. Underwater applications of ultrasonics have now been extended to include depth-finding and the determination of submerged obstructions.

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AGRICULTURE

Prize Cows' "Milk Veins" Unrelated to Milk Output

➤ "Milk veins" and "milk wells", long a guide in judging prize cattle, have little or no relation to a cow's milk-producing ability.

This time-honored criterion of the judging ring was shattered by W. W. Swett and C. A. Matthews of the Bureau of Dairy Industry. A detailed study of almost 200 cows of the Beltsville, (Md.) experimental herd showed that no correlation exists between milk production and the presence or size of veins or wells on the udder and abdomen.

These findings resulted from a larger study on the structure of the udder and the blood and milk circulatory systems. Studies show that 400 pounds of blood passes through the udder for each pound of milk produced. This would amount to 20,000 pounds of blood for a cow producing 50 pounds of milk a day.

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CHEMISTRY

Off Flavor Milk Is Not Cow's Fault

➤ IF the milk tastes odd, don't blame the cow, says Dr. C. Jensen, head of the dairy department of North Dakota Agricultural College.

If there is an off flavor to your milk, the chances are that neither the cow, the farmer nor the milkman are at fault. Most flavor change takes place after the bottle has been left on your doorstep.

"Off flavor in milk may not always be the responsibility of the producer and processor," Dr. Jensen said. For example, "oxidized flavor" is a reaction produced when milk is exposed to light. Half an hour to an hour of indirect sunlight, and a much shorter exposure to direct sunlight, is enough to produce this "oxidized" effect.

Dr. Jensen stressed that this does not affect the nutritive value of the milk but merely renders it less palatable. To avoid it, he suggests either that the milk be put away immediately after delivery, or else that some provision be made so that the milkman can place the milk inside the door or in a container away from sunlight.

Another source of strange milk flavor, he pointed out, is strongly-flavored foods placed close by in the same refrigerator. Such foods should be segregated if possible or at any rate be kept tightly covered.

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E FIELDS

BIOCHEMISTRY-MEDICINE

Protein Is Key Problem Of Life and Disease

➤ THE key problem in the world today is the protein problem, Dr. Dorothy Wrinch, lecturer in physics at Smith College, Northampton, Mass., declared.

"Wherever there is life, there is protein," she stated.

Protein chemicals, most familiar to the layman in foods such as meats and eggs, "have functions which are denied to all other substances," Dr. Wrinch pointed out.

"They control our heredity through the genes in the chromosomes. They control the utilization of food through enzymes, which are also proteins. They are the essential factor in polio and a host of other virus diseases. They are also the essential element in the control of disease by immunization (vaccination) for the antibodies, too, are proteins."

The atomic bomb, which emerged to almost everyone as an accomplished fact, was built upon the "quiet work of research scientists working in remote laboratories," and brought to fruition by the vast war project, Dr. Wrinch pointed out.

Right now, only a few scientists have the background for solving the key problem of the proteins. But, Dr. Wrinch said, "each of us, by mobilizing public opinion to call for an attack on this great problem which is worthy of its supreme objective, can help towards its solution."

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CHEMISTRY

Citrus Fruits May Be Saved by "Breathing" Tests

➤ A NEW type of oxygen analyzer, based upon a similar machine developed for the U. S. Army medical corps during World War II, may help to save thousands of dollars worth of California, Texas and Florida citrus fruit which is now lost through poor storage.

Developed by Dr. Jacob Biale of the University of California at Los Angeles, the machine measures the "breath" of oranges, lemons, grapefruit, avocados and other subtropical fruit.

Fruit breathes like human beings in the sense that it takes in oxygen and gives off carbon dioxide, points out Dr. Biale. The oxygen determines how long the fruit will last in storage.

The newly-developed oxygen analyzer measures the oxygen content of incoming and outgoing air in specially devised storage jars with no interference from other common gases. It is capable of keeping

such a record of 24 jars simultaneously.

This device enables Dr. Biale and his assistants to keep track of the respiratory processes of fruit under varying temperatures and in combinations of gases piped into the fruit. The machine is also used to measure respiration in atmospheres high in carbon dioxide and low in oxygen, as well as the effects of ethylene, a gas used to hasten the ripening of fruit.

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CHEMISTRY

Radioactive Cosmetics Test Effect on Skin

➤ COSMETICS are now being made radioactive in order to study the effects of various preparations on human skin.

Cold cream, such studies have already shown, does not penetrate the skin. The cream was made with carbon 14 and its penetration, or lack of it as it turned out, was determined by Geiger counter.

The possibility of skin penetration by other components of the cream which were not tagged with the radioactive carbon is not ruled out. Tests of creams containing hormones, iodine or mercury derivatives will be made next, Dr. Louis C. Barail and Joseph J. Pescatore, of the U. S. Testing Co., Hoboken, N. J., stated in their report to the Society of Cosmetic Chemists in New York, N. Y.

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AERONAUTICS

New York-Los Angeles In One Hour by Rocket

➤ FLYING from New York to Los Angeles in less than an hour via rocket ship waits only on the building of the rocket. Rocket expert Dr. Hsue-Shen Tsien told the American Rocket Society that such a rocket is within the grasp of present day technology.

The passenger rocket-liner, said the Chinese-born scientist, would reach an altitude of 27 miles on its initial thrust in a matter of minutes, and then would glide the rest of the way. Although top speed would be 9,140 miles per hour, the rocket could land as slowly as 150 miles per hour.

Research done at the Daniel and Florence Guggenheim Jet Propulsion Centers at California Institute of Technology and Princeton have contributed to the solution of the basic technological problems, according to Dr. Tsien, who is Robert H. Goddard professor at the Caltech center.

Dr. Tsien states that research will solve the problems of designing an engine which can take the terrific heat generated and of insulating the rest of the rocket ship from that heat. The ship would weigh 50 tons, and 37 tons would be fuel load. It would be 80 feet long and nine feet wide, with small wings to achieve a reasonable landing speed, he estimated.

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BIOCHEMISTRY

Blood Has More Sugar In Winter Months

➤ HUMAN blood gets sweeter, has more sugar in it, in the winter.

This was discovered accidentally by Drs. Lois F. Hallman and Elsa Orent-Keles, U. S. Department of Agriculture nutrition scientists.

They were studying the effects of breakfast when they found that the amount of sugar in the blood before breakfast increased progressively with the colder months of the year and was definitely higher in the winter than during the summer months. The work was done over a two-year period on nine women laboratory workers of average weight and height, moderately active and considered in good health. Their ages ranged from 28 to 48 years.

Whether the seasonal difference in blood sugar is due to variations in diet or to differences in the body's handling of food is not known.

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MEDICINE

Aureomycin Is Successful In VD Cases

➤ DISEASES from canker sores to gonorrhea and pneumonia are being cured by the golden yellow mold drug, aureomycin. A summary of latest reports of the uses and effectiveness of this drug is being shown to physicians at the American Medical Association meeting in Washington, D. C., by Drs. Raymond W. Cunningham, A. C. Dornbush, B. M. Duggar and B. K. Harned of Lederle Laboratories, Pearl River, N. Y., where the drug is made.

The drug was 100% successful in 20 unselected cases of gonorrhea, when given by mouth over a two-day period. A single injection of 300,000 units of penicillin in oil and wax achieved 90% success in another 20 unselected gonorrhea cases. One patient with gonorrhea who was not helped by 20 injections into the muscles of 300,000 units of penicillin in oil and wax recovered rapidly when given aureomycin by mouth.

Aureomycin has been reported successful, the doctors said, in all five venereal diseases and is useful as a general prophylactic for these when taken by mouth.

The pain of canker sores and other more serious inflammations of the gums stops quickly and the sores soon disappear when aureomycin is given, two dentists found. Removal of impacted wisdom teeth when there is acute or subacute inflammation of the gums around the crown of the partly erupted teeth has been a controversial subject among dentists. But patients with this tooth and gum condition were able to have the impacted teeth removed without complications after the operation when aureomycin was given.

Science News Letter, December 17, 1949

ARCHAEOLOGY

Toys Reflect Man's Culture

Scientists are able to measure the degree of culture attained by a people by studying the use to which dolls are put. American toy business is now enjoying a boom.

By WADSWORTH LIKELY

► LONG ago, primitive man bowed down to graven images, worshipped rudely carved idols. Then, when he began to grow more civilized and lost his fear-begotten respect for his idols, the images were handed to his children—and became the ancestors of the \$65,000,000 worth of dolls that will be found under this year's Christmas trees throughout the country.

Scientists find it possible to measure the degree of culture attained by a people with great accuracy by studying the use to which the images we call dolls are put. And not only has the use of dolls and other toys been a signpost on man's road from savagery to civilization. Toys have always reflected the culture and growth of a people.

Toy Boom Unprecedented

The American toy business is now in an unprecedented boom. In 1929, the 36,205,000 children under 15 received about \$97,000,000 worth of toys. This year, there are only 4,000,000 more children under 15, but they are receiving toys which cost three times as much.

It would be interesting to see what some future scientist concludes when he comes across a doll whose hair can be washed and waved in the rubble of one of our cities.

It was very early after the change of status of the doll from an idol to a plaything that boys and girls began to branch out in different directions in the matter of toys. A girl's playtime orbit, through the ages, has revolved around the home and her mother's activities in the home, and the doll has remained the focus of her play. It is only recently, with the advances of women in science and industry, that girls have begun to invade the boys' domain in the matter of playthings.

Boys have always patterned their play on the lives of their fathers. Little wooden animals, and an ancient Greek prototype of the American express wagon were examples of the way the boys aped their fathers.

There has been the least change of all in toys for the youngest babies. The wooden crocodile with a movable jaw that delighted some Egyptian baby 3,000 years ago is not so very different from the painted arts and craft toys Santa Claus will bring this year.

Most of the ancient toys that have sur-

vived from early times were made of clay. The first dolls were probably rudely carved out of wood, but because wood is perishable, few have survived. We have, however, many little clay objects—rattles, small pots and miniature figures of animals.

First Wheeled Toy

It was as far back as the eleventh century, B. C., that the first known toy on wheels was made. Archaeologists discovered in the foundation stone of a temple in Susa, Persia—built about that time—two little animals made of white sandstone. Both were mounted on little wheeled stands, with a hole through one end of the stand for a drawstring.

Young boys of ancient Greece had two-wheeled carts with a long pole and crossbar for a handle. It cost the equivalent of three American cents in the Athens market.

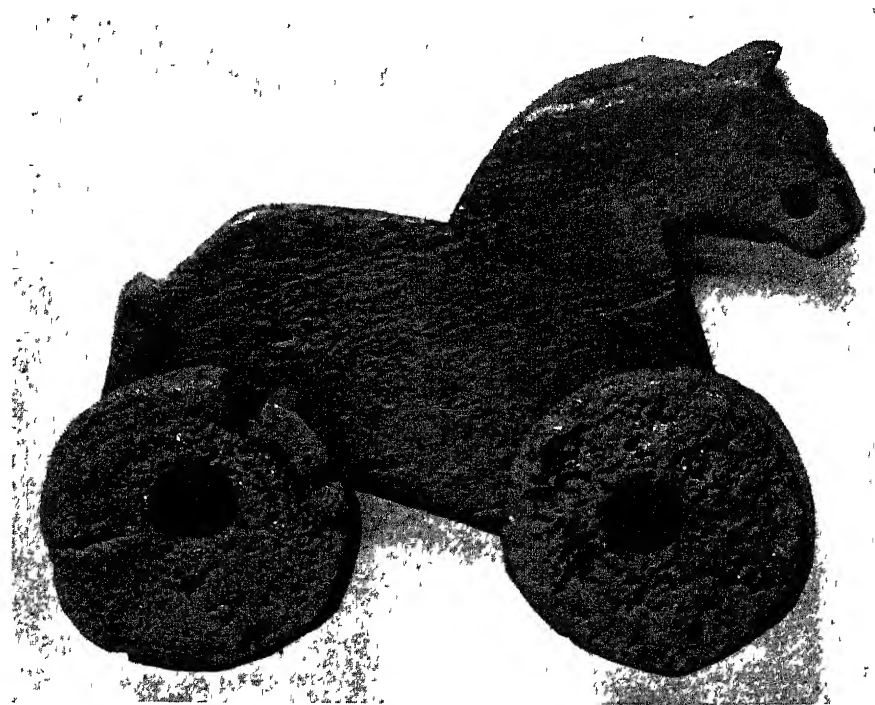
When the civilization of ancient Greece and Rome was forgotten in the dark ages, toys were largely forgotten too. In those

times, when living, even for the very rich, was crude and uncomfortable, toys weren't considered important. For that matter, neither were children. There are few pictures of children, except the Christ child, from that time. And only a few clay dolls, horses and armored knights survive that rough era.

German Toymakers

There is evidence that toymaking first became an industry in Nuremberg in Germany. In the 15th century the demand for religious objects began to fall off, especially from northern Germany, and the hand workers around Nuremberg turned to toys. In the 16th century, when toys became fashionable among queens and duchesses, the medieval guilds began organizing the toymaking crafts. Each craft insisted on making its own part of the more complicated toys. For a time, this specialization prevented the establishment of toy factories in the modern sense of the word, but eventually, it was from the medieval guilds that the once-great German toy industry grew.

Dolls and toys were not very common among the North American Indians, especially among the eastern tribes. However, the Eskimos, perhaps because of the neces-



TOY HORSE—In the 11th century B. C. a little boy was pulling this wheeled toy around on a string.



MEDIEVAL TIN SOLDIER—This little tin knight from the Age of Chivalry is the forerunner of the tin soldier of our present day.

sity of providing something to keep the children amused during the long winter nights, carved exquisite toys out of ivory.

One of the first known articles imported to America from Europe was a doll, brought here in 1607 by the Sir Walter Raleigh expedition. There is a picture, drawn by the expedition's artist, showing a fluffy little doll, dressed in Elizabethan finery that must have seemed strange to the Indians, being presented to a little Indian girl.

Mechanical Toys

Since man has been interested in things mechanical, boys have had mechanical toys. And the development of boy's playthings has kept pace with the scientific and industrial developments of their fathers. In the 19th century, the Germans and Swiss brought about a whole new era in the manufacture of toys—utilizing the scientific advances of the industrial revolution. Now the traditions of that era have passed to the United States, and with it the traditions of the earliest known toy—the graven image that became a girl's doll.

Science News Letter, December 17, 1949

PSYCHIATRY

Secretary Substitutes Baby for Typewriter

➤ THE perfect secretary is likely to be a bad mother. Her child, especially her first-born, becomes more or less a substitute for her typewriter, Dr. Leo Kanner of the Johns Hopkins Hospital, Baltimore, declared at the meeting of the American Medical Association.

A moderate emotional climate, he pointed out, is best for children. But many

mothers veer to one or another extreme of emotional climate. Some find it hard to like and approve of their children the way they are. Others find it hard to do their "mothering without overanxious and oversolicitous smothering."

Much of the trouble mothers have with their children, and children with their mothers, comes from the fact that young women are "no longer reared for the main purpose of becoming wives and mothers."

"Most girls nowadays are prepared for a vocation," Dr. Kanner said. "This mode of living prior to marriage can be a major boon to the stable woman who comes to married life enriched by the responsibility, activity and association which the job affords her."

"But very often the job puts a premium on punctuality, meticulousness and perfectionism which it often becomes impossible for the mother to shake off when dealing with her children."

"Especially the first-born child of the secretary, the salesgirl, the factory pieceworker, the laboratory technician, the librarian or the nurse gets the whole brunt of this tense perfectionism, being more or less a substitute for the typewriter, the cash register, the machine, the test tube, the book shelf or the medicine cabinet."

Baby doctors, psychologists and psychiatrists did their share of mechanizing and frightening mothers in the first quarter of this century, Dr. Kanner charged. In the effort to teach mothers generally to apply valid principles of feeding and hygiene to their babies, these specialists turned many into "mechanical robots" who dared not depart an iota from the prescribed rules for calories, sleeping hours and other regulations.

"Fortunately," said Dr. Kanner, "there were many calm, stable, fond mothers who didn't allow themselves to be swayed by all those cultural assaults on their common sense."

Mothers who themselves have been hurt by their own life experiences, however, still are likely to follow rigidly rules and regulations on child rearing because doing so meets emotional needs of their own.

Science News Letter, December 17, 1949

WILDLIFE

Thousands of Elk to Starve This Winter

➤ DEATH by starvation is in store for thousands of Yellowstone Park elk this winter unless quick action is taken to allow hunters to "harvest" the excess animals.

Biologists of the National Park and Forest Services in Washington, D. C., as well as rangers in the Park, are deeply concerned over the growth of the elk herd to 11,000 on a range that can not properly sustain more than 5,000.

They have proposed that hunters be

allowed to kill 5,000 animals this year. The remainder, while greater than the desirable maximum, would be able to survive on the available forage, without either starvation of the animals or destruction of the plant cover.

The decision rests with Montana game officials who control licenses and bag limits. No shooting is allowed in the Park itself.

The current elk hunting season will result in a take of some 2,000 of the excess animals. Federal biologists are waiting to see whether the Montana State Fish and Game Commission will authorize an extension of the hunting season so that the herd can be reduced to healthy proportions. If action is not taken soon, they point out, it will be too late because after the first of the year the cows start to become heavy with calf and the flesh becomes stringy and undesirable as meat.

The Montana Fish and Game Commission was scheduled to take up the matter of the additional elk kill on Dec. 12 and 13 at Helena. They deferred action at the November meeting in order to weigh the arguments of groups that object to extending the kill.

Chief objectors are labor groups, notably the International Association of Machinists at Livingston, Mont.

Science News Letter, December 17, 1949

ARCHAEOLOGY

Pre-Columbian Furnaces Pronounced Lime Kilns

➤ OLD furnaces dug up near Chillicothe, Ohio, by Capt. A. H. Mallery, Washington engineer, and believed by him to be pre-Columbian iron furnaces (See SNL, Nov. 12, p. 309) were pronounced by Dr. Ralph Solecki, of the Smithsonian Institution, to be 19th century lime kilns, it was announced in Washington, D. C. Dr. Solecki visited the site at the invitation of Capt. Mallery to aid in evaluating the archaeological importance of the find.

Nothing of archaeological interest was found in the site, Dr. Solecki said.

The iron bar found by Capt. Mallery in one of the furnaces and believed by him to indicate that the furnaces were used for iron making, may be explained as being a bar in a grate of the lime kiln, Dr. Solecki said.

Capt. Mallery has for many years pursued a hobby of tracing evidence for Viking or perhaps even earlier cultures in America before the time of Columbus. Iron specimens uncovered previously at the Ohio site by Capt. Mallery have been pronounced by metallurgists as not of modern manufacture.

Science News Letter, December 17, 1949

Apples treated in a calcium chloride solution remain firmer and have superior baking qualities without impairing taste or flavor.

MEDICINE

Rh Factor-Deafness Linked

➤ **DISCOVERY** that the Rh blood factor is linked with congenital deafness is announced by three University of Pennsylvania medical scientists in Philadelphia, Pa.

The scientists are Drs. Harry P. Schenck, Joseph Sateloff and Neva M. Abelson.

"The Rh factor is one of the main causes, if not entirely the main cause, of the hearing defects" in children with cerebral palsy is the "apparently inevitable conclusion" of the studies made at the University Hospital.

Whether children born with hearing defects and speech irregularities, but without cerebral palsy, also owe their deafness to Rh trouble is now under investigation at the University Hospital and Children's Hospital.

Starting point for the studies came partly from findings of Dr. Winthrop M. Phelps of Baltimore. He had observed that a large percentage of children with cerebral palsy have a "singular type of nerve-hearing impairment" involving functioning of the auditory (hearing) nerve. Hearing experts at the University had long suspected a connection between congenital hearing defects and the Rh factor.

Dr. Phelps sent a group of about 50 cerebral palsy children from the New Jersey Crippled Children Commission to University Hospital for study. The children all had the athetoid type of cerebral palsy, characterized by recurring series of slow, wormlike movements of hands and feet. This type of the condition is believed due chiefly to a brain injury. Many of the children had hearing defects of one kind or another and also speech disorders such as inability to pronounce certain letters of the alphabet or combinations of letters.

Rh blood tests were made on all the cerebral palsy patients and on their parents. About 87% of normal persons have the Rh factor in their blood, and are known as Rh positives. The remaining 13% lack the factor and are known as Rh negatives. When an Rh negative woman marries a man with Rh positive blood, the unborn child's Rh positive blood calls up antibodies to it in the mother's blood. This may endanger both mother and child. If the baby survives, it may be sickly and have bodily defects. Deafness, according to the present studies, may be one such defect.

Science News Letter, December 17, 1949

MEDICINE

Plastics In Body Danger

➤ **A WARNING** of possible danger from use of two plastic materials, cellophane and polyethylene films, within the body for spare parts or in plastic operations was sounded by three physicians from Columbia University, New York, at the meeting of the American Medical Association in Washington, D. C.

They wrapped cellophane around the kidneys of white rats and embedded the material in the abdominal walls of other rats. Cancers developed in 35% of the animals that survived the minimum time for induced tumors to appear. The tumors, or cancers, were mostly fibrosarcomas. Less than one percent of rats develop this type of cancer spontaneously.

Polythene, trade-name for polyethylene, embedded under the skin of white rats was followed by development of sarcomas in 11.4% of the animals that survived the 392 days which is the minimum time for appearance of induced tumors.

Cellophane and polyethylene films, the Columbia scientists pointed out, have been used in human surgery experimentally to replace the membrane covering the brain, and for tendon transplantations, connecting cut nerves, in artery surgery and in plastic operations on joints.

No cases of cancer have so far been re-

ported from use of these materials in humans, they stated.

The scientists reporting this study were Drs. B. S. Oppenheimer, E. T. Oppenheimer and A. P. Stout.

Science News Letter, December 17, 1949

ZOOLOGY

Hawaiian Lobsters Are Not Emigrants from U. S.

➤ **HAWAIIAN** crabs, lobsters and other marine crustacea in the mid-Pacific area did not migrate from the west coast of the United States as had previously been supposed.

Dr. Gordon Ball, University of California at Los Angeles protozoologist, says that gregarine parasites (microscopic protozoa that make their home in the bodies of crustaceans on both the east and west coast of North America) do not exist among the Hawaiian crabs.

The presence or absence of these parasites is one method of tracing the origin of species of crustaceans. The gregarines are passed on from generation to generation. Their development in crabs and lobsters helped tell the story of the development of their hosts.

Whether the Hawaiian crustaceans migrated from farther east in the Pacific, perhaps from the Asiatic mainland, or represent a unique island fauna is not known at present. At least it is fairly certain that they did not migrate from the United States, points out Dr. Ball.

The U. C. L. A. zoologist also has made studies of crabs around Bermuda. He found that parasites in these crustaceans greatly resembled those in California crabs.

How they made this journey before the Panama Canal was built, he refused to hazard a guess.

Science News Letter, December 17, 1949

GENERAL SCIENCE

Reasonable Precautions Will Make Xmas Safe

➤ **A MERRY** Christmas with a sorrowful ending from fire and accidents with toys can be prevented by reasonable precautions easily taken, the nation is being warned by several organizations.

The Christmas tree is a number one fire hazard. Trees can be made less flammable by the use of fire-retardant coatings. The most practical, satisfactory and convenient method for reducing the danger of fire, however, is to keep Christmas trees standing in water, the U. S. Forest Products Laboratory states.

And even if the trees are coated with fire-retardant preparations, they should still be kept in water, this government agency declares. The water not only makes them less flammable but also prevents the needles from discoloring and falling.

Use a tree that has been cut as recently as possible, the laboratory advises. Cut off the end of the trunk diagonally at least one inch above the original cut end. Stand the tree at once in a container of water and keep the water level above the cut during the entire time it is in the house.

Before a string of electric lights is put in the tree, it should be carefully examined and tested to make certain that the insulation is in perfect condition. It is important also to test all electrical toys before they are given to children to use. The electric shock from a bad connection or poor insulation might be minor as far as its intensity is concerned, but a shock harmless to an adult might prove serious for a child.

Non-electrical toys may also be dangerous, the National Society for the Prevention of Blindness declares. "Look for the toys that provide fun without danger," it advises. A box of tools can be an educational device or a menace to eyesight, depending upon the ability of the youngster to handle tools.

Look for rounded corners and blunt points on toys, and be sure the toy is well-built and will not break up into jagged pieces, the Society adds.

Science News Letter, December 17, 1949

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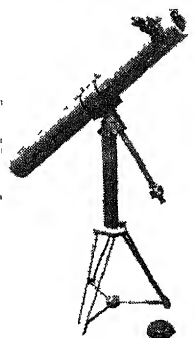
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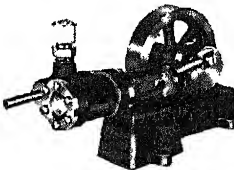
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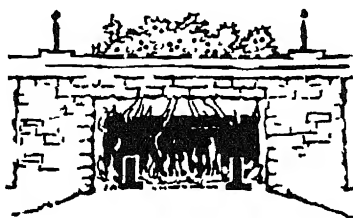
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Christmas Botany

➤ ON the secular side Christmas is gifts and good cheer, family reunions and good companions, snow, lights, bells and Kris Kringle. And it is also the trees and plants with which we bedeck the festival.

These trees and plants form a special Christmas herbarium. In first place, of course, is the tree itself. Most of our Christmas trees are spruce. There are several kinds of spruce but they can all be told from the other evergreens by their needles.

Spruce needles are short and quite stiff, and each one stands up on a sort of little pedestal by itself.

Fir trees are sometimes used. Their needles are softer than spruce, and somewhat curved. The Douglas fir is used quite extensively in the Northwest. Of course the kind of tree cut for Christmas tree depends on the available local supply. In pine country, pine trees are the prevailing type. Unlike the spruce-fir group, pine needles are borne in little clusters of from two to five.

Mistletoe is firmly entrenched among the pleasanter frivolities of the season. Custom has endowed it with a special charm and power, and though small it sells extremely well. So well in fact that florists now package it in little cellophane bags, complete, rumor has it, with pins for fastening to ladies' hats.

Botanically, mistletoe is a parasitic plant which grows not in the soil but on trees, deriving much of its sustenance from them. However much foresters, like other men, may value mistletoe at Christmas time as a subterfuge for kissing, their year 'round professional view of it is as a plant pest that saps, and sometimes dwarfs and kills the trees it feeds on.

Honored in a different way are holly and poinsettia. Of the two holly is the older as

a Christmas plant. But when this evergreen became threatened with extinction when our expanding population created an ever-increasing demand for it, a substitute was sought. Poinsettia, which had been in use as a Christmas plant in California, was readily seized upon. Both are desired for their attractive display of the season's colors.

The Yule log, while in no sense a botanical species, deserves some notice, if only for its antiquarian interest. The disappearance of the Yule log can be attributed to two things: the clearing of the great forests, and central heating. In olden times the custom was to hunt up the biggest log to be found. It was usually oak. Cut as generously as possible so it would still fit the fireplace, it was then set in place at the back of the fire to burn unattended during the days of prolonged revelry.

Great oaks are rare and fireplaces are more so. When Christmas comes, no special effort is needed to keep the house cozy. The furnace is stoked or the thermostat set just as on any other winter day. The nearest thing to the Yule log custom is an act that has become traditional on Christmas Day among folk who live in apartment houses. That is the Christmas gift to the superintendent. Experience has shown that if the donation be large enough, the house will be snug well into the New Year.

Science News Letter, December 17, 1949

MEDICINE

More, Cheaper Cortisone

➤ A MERRY Christmas and happy New Year are in store for some more sufferers from arthritis and rheumatic fever and patients with other chronic ailments, including mental disorders for which cortisone shows promise as a remedy.

There will be more of the precious chemical available in 1950 and its price has been cut by one-fourth, the manufacturers, Merck and Co., Rahway, N. J., announce.

There is no promise in the announcement that there will be enough of the chemical to treat very many patients with arthritis. But the company believes its increased production in the first half of 1950 will be enough "to supply various teaching medical centers with limited quantities for research purposes."

Two important advances should result: 1. discovery of new conditions for which the drug will be useful, 2. more knowledge of how to use it safely and effectively.

The price cut goes into effect this month. The new institution or hospital price will be \$150 per gram, compared to the \$200 to \$400 per gram the chemical cost last August. In August it cost at least \$20 per day to sustain a patient with 100 milligrams of cortisone. Now a vial containing three times that amount, or 300 milligrams, will cost \$45.

After Dec. 31 the National Academy of Sciences committee on investigation of cortisone will terminate its activities and Merck and Co. will take over the allocation and distribution of the chemical. First priority will be given to various research products for which cortisone has already been supplied and some for which applications are still under consideration by the National Academy of Sciences committee.

After those research demands are met priority will be given to requirements of teaching medical institutions in the United States and Canada and to appropriate research centers under Government supervision.

Cortisone can be shipped only for use in medical research, since the U. S. Food and Drug Administration has not yet released it for general distribution.

Science News Letter, December 17, 1949

PLANT PATHOLOGY

DDT Helping Save Elm from Extinction

➤ EFFORTS to save the shade-giving elm from Dutch elm disease show promising results after two years of experiments.

DDT applied with a mist blower eliminates the disease from 91% of the tree, says Dr. George H. Plumb, entomologist at

the Connecticut Agricultural Experiment Station, New Haven, Conn. The spraying was made more difficult, he says, by the fact that the trees treated stood on narrow residential streets, and special care had to be taken to keep the spray from drifting.

The American elm has been seriously threatened by Dutch elm disease and also by a disease called elm phloem necrosis which causes the leaves to fall off and the roots to die. The fight to save the elm from extinction has been fought on two fronts. One has been with chemicals like DDT to kill the disease carriers. The other, which has also met with some success, has been the attempt to breed new kinds of elms which are resistant to the disease.

Science News Letter, December 17, 1949

GENERAL SCIENCE

Cancer, Brain Stories Win Science Writing Awards

➤ A NEWSPAPER series about cancer and a magazine article on the human brain won this year's George Westinghouse Science Writing awards of \$1,000 each.

Lester Grant, science reporter for the New York Herald-Tribune, and George W. Gray, of Sparkhill, N. Y., writing in the SCIENTIFIC AMERICAN, were named winners of the fourth annual contest.

The awards, administered by the American Association for the Advancement of Science, will be presented at a luncheon on Dec. 28 in New York.

Science News Letter, December 17, 1949

Books of the Week

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ASTM STANDARDS ON TEXTILE MATERIALS (With Related Information)—ASTM Committee D-13 on Textile Materials—*American Society for Testing Materials*, 574 p., illus., paper, \$4.50. A compilation of articles on terms and definitions, methods of testing, and specifications for textile and related materials.

THE FIELD SCIENTIFIC LIAISON WORK OF UNESCO—UNESCO, 67 p., illus., 30 cents. An explanation of a little known UNESCO activity.

FRANCIS BACON Philosopher of Industrial Science—Benjamin Farrington—*Schuman*, 202 p., illus., \$3.50. Written with the idea that to achieve progress today and in the future, we must know the past. This is volume 11 of Henry Schuman's Life of Science Library.

GIANT BRAINS OR MACHINES THAT THINK—Edmund C. Berkeley—*Wiley*, 270 p., illus., \$4.00. A description of several existing large-scale mechanical computers, including a brief discussion of their social significance. Written in non-technical style.

THE GIANT WIDENS HIS WORLD The Middle Ages and the Renaissance—M. Illin and E. Segal—*Interscience*, 223 p., \$2.50. A brief history of scientific development during the age of darkness and superstition.

HOW TO STAY HEALTHY—Irvin S. Koll—*Ziff Davis*, 203 p., \$2.75. Preventive medicine in non-technical language.

HUNGER SIGNS IN CROPS—Firman E. Bear and others—*American Society of Agronomy and National Fertilizer Association*, 2nd ed., 390 p., illus., \$4.50. An aid in recognizing the signs of nutritional deficiency in crop plants. Many color plates show different mineral deficiencies.

OUR STARLAND An Easy Guide to the Study of the Heavens—C. C. Wylie—*Lyons and Cannon*, 378 p., illus., \$1.05. Introducing young people to the stars and their mythology. For grade school age.

PRINCIPLES OF A NEW ENERGY MECHANICS—Jakob Mandelker—*Philosophical Library*, 73 p., illus., \$3.75. The author presents his conception of the whole body of science.

PROCEEDINGS FOR THE YEAR 1948-1949 Virginia Academy of Science—*Virginia Academy of Science*, 192 p., paper, \$1.50. The annual report of the Academy meeting held in Richmond, Virginia, May 5, 6, 7, 1949.

PROCEEDINGS OF THE INTER-AMERICAN CONFERENCE ON CONSERVATION OF RENEWABLE NATURAL RESOURCES—Department of State—*Gov't Printing Office*, 782 p., illus., \$2.25. Outstanding conservation leaders and technicians of the Western Hemisphere presented these papers on the fundamental problems concerned with the future of civilization at the first Inter-American Conference On Conservation, at Denver, Colorado, September 7-20, 1948.

PROGRESS IN SEVEN FIELDS OF MANAGEMENT 1932-1949—*American Management Association*, 31 p., paper, free upon request to the publisher, 330 West 42nd Street, New York 18, N.Y. A complete catalogue of the publications of the Association from February, 1932 to November, 1949.

RESULTS OF THE TWO CARPENTER AFRICAN EXPEDITIONS, 1946-1948, Part II—Fishes—Henry W. Fowler—*Academy of Natural Sciences of Philadelphia*, 42 p., illus., paper, \$1.30. A monograph on the fishes collected on these expeditions.

A SECOND COURSE OF ELECTRICITY—A. E. E. McKenzie—*Cambridge University Press*, 357 p., illus., \$2.50. A sequel to the author's *Magnetism and Electricity*. A textbook.

SUGAR DERIVATIVES A SURVEY OF POTENTIAL PRODUCTION COSTS—Harold E. Bode—*Sugar Research Foundation*, 35 p., illus., free upon request to publisher, 52 Wall St., New York 5, N.Y. Presents in tabulated form sugar derivatives which are potentially capable of being produced at a material cost of less than one dollar per pound. For the technician.

TELEVISION FOR RADIOMEN—Edward M. Noll—*Macmillan*, 595 p., illus., \$7.00. A text for practical radiomen, and television students.

WOODY-PLANT SEED MANUAL—Forest Service U.S. Department of Agriculture—*Gov't Printing Office*, 416 p., illus., \$2.75. Brings together information on phases of seed handling.

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PALEONTOLOGY

"Chinless" Ancestor Found

➤ ONE of man's oldest ancestors was a man without a chin. Report of the discovery of his bones has just been received from France.

In a cave called Coupe-Gorge, opened accidentally by quarry workers at Montmaurin, Haute-Garonne, one of the excavators found some interesting bones and called in L. Merco of the Toulouse Museum. Under his direction the workman dug up a lower jaw of Neanderthal type which had been buried there about 50,000 years.

This jaw is complete, but only three molars remain on each side, the other teeth having long since disappeared.

The teeth show that the gentleman of Montmaurin was a youth about 20 years old. The most striking feature is the entire absence of a chin. In this respect this mandible resembles the Mauer jaw, known as Heidelberg man (*Homo heidelbergensis*) and attributed to a period about 250,000 years ago. However, since Neanderthal Man roamed Western Europe from 75,000 to 40,000 B.C., the man who left his jaw in the Mauer sands may have been a direct ancestor of our new friend from Montmaurin.

In a personal communication Mr. Merco writes that Prof. H. V. Vallois, of the In-

stitut de Paleontologie Humaine in Paris, examined the new jaw and agrees that it is one of the most primitive types known.

The Abbe Henri Breuil, world's foremost prehistorian, examined the site recently and estimates that the Coupe-Gorge mandible is as old as the stone implements found in the lowest Mousterian levels, attributed to the last interglacial period.

The Mousterian tools are so called because they were found at Le Moustier, Dordogne, France. They are really the handiwork of Neanderthal Man who was given his name because his bones were originally discovered in 1857 in the Neander Valley near the Rhine.

The discovery of the Coupe-Gorge jaw adds an important link in the chain of evidence for the range of Neanderthal Man. It is now known that he lived in regions all the way from the rock of Gibraltar on the west to Tashkent in Soviet Central Asia on the east. His Mousterian cultures have been found far more extensively across Europe into Siberia, in Asia and Africa.

Science News Letter, December 17, 1949

Peanut butter can be used for part of the shortening in breads.

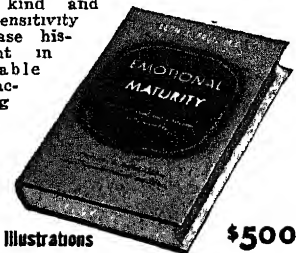
A Guide to Human Behavior

EMOTIONAL MATURITY

The Development and Dynamics of Personality

by Leon J. Saul, M.D.

Fundamental facts concerning neuroses—those minor mental disorders from which no one is entirely free. The book reveals the basic similarities in what men feel and can stand as well as individual differences in kind and degree of sensitivity. Illustrative case histories present in understandable fashion the factors influencing emotional development.



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Science News Letter, December 17, 1949

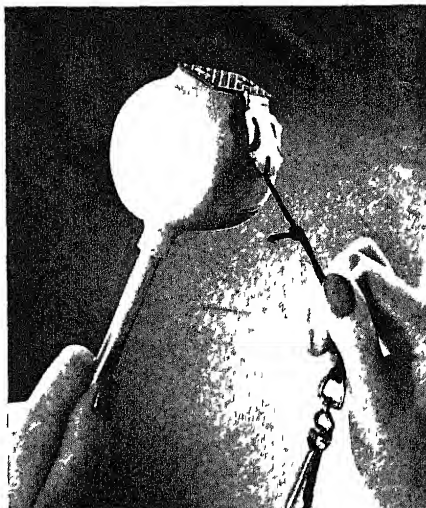
⚙️ **ELECTRIC WATER COOLER**, a type which has a compartment for storing milk and another for making ice cubes, maintains the three temperatures in the water-cooling chamber, the freezer and the refrigerated space independently of each other. Heavy duty in one does not affect the others.

Science News Letter, December 17, 1949

⚙️ **DIVING MASK** with pressure equalizing ear caps, for use in the popular sport of spearing fish under water, has the ordinary transparent front covering for the eyes and nose but also has attached ear-covering caps. Air ducts connect the face mask and ear caps in this newly patented device.

Science News Letter, December 17, 1949

⚙️ **TETHER FOR THE TODDLER**, shown in the picture, contains a reel in



a plastic case and a safety line which allows the baby free movement within a safe area. The line, snapped to the child's belt, reels in and out automatically. The reel case is shown screwed to a stake to push into the ground.

Science News Letter, December 17, 1949

⚙️ **HOME FIRE ALARM** gives loud warning in a few seconds after a fire starts in any part of the house. It uses many small detector units placed in strategic places, each of which has a metal link that melts at about 150 degrees Fahrenheit, opening an electric circuit to operate the alarm.

Science News Letter, December 17, 1949

⚙️ **RADIATION COUNTER TUBE**, for beta and gamma ray detection is a thin metal wall tubular affair which may be operated over a wide temperature range without affecting tube life or electrical characteristics. This self-quenching tube features rugged construction, unlimited life and low operating voltage.

Science News Letter, December 17, 1949

⚙️ **FOUNTAIN BRUSH CLEANER**, to clean spots on clothing or office machinery, is toothbrush-size and has an elongated bottle, which holds the cleaning fluid, for a handle. By pressing a button over the brush, the non-inflammable fluid flows from bottle to bristles.

Science News Letter, December 17, 1949

Do You Know?

The so called *rain-lily*, more properly the zephyranthes, gets its name from its habit of blooming when the plant gets a good watering after a dry spell of a few weeks.

A live-fish transport vessel, recently launched in Norway, will enable Norwegian housewives to purchase their fish alive, a preferred method for many.

Total number of specimens in entomological collections of the American Museum of Natural History, New York City, is now 2,700,000, transcontinental field expeditions added 63,000 insects and spiders this year.

The Christmas cactus, *Zygocactus truncatus*, is an old-fashioned American house plant that originated in Brazil, it requires a richer soil than the desert cactus, and also requires good drainage.

A large part of southeastern England is covered with a clay that has adequate load-bearing strength but it dries and shrinks in summer and swells in winter, often causing damage to buildings without deep foundations.

CHEMISTRY for Christmas

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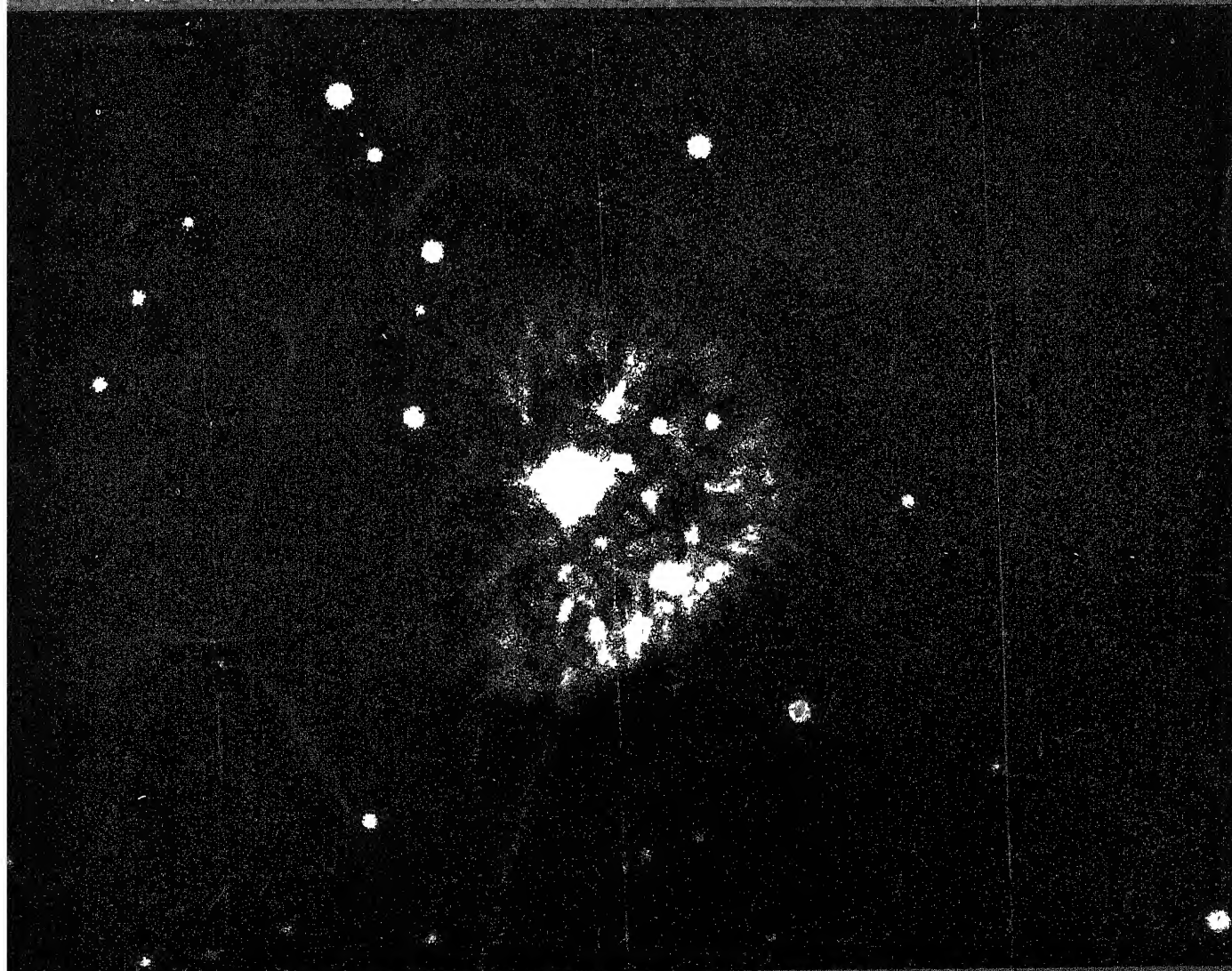
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SCIENCE NEWS LETTER

In This Issue—SCIENCE REVIEW OF THE YEAR

®

THE WEEKLY SUMMARY OF CURRENT SCIENCE



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VOL. 56 NO. 26 PAGES 401-416

ENTOMOLOGY

DDT Conditioning Theory

Development of resistance to DDT in mosquitoes is likened to morphine addiction in humans. Old DDT deposits are probably the source of the chemical causing resistance.

► DEVELOPMENT of resistance to DDT in house flies and mosquitoes comes about in much the same way as morphine addiction in humans

This explanation of a new theory of DDT "conditioning" as the cause for resistance to the insecticide was presented by Dr R. W. Fay of the Communicable Disease Center, U. S. Public Health Service, at the meeting of the Entomological Society of America in Tampa, Fla. Dr Fay is stationed at the Center's Technical Development Division at Savannah, Ga.

DDT resistance may result, Dr Fay believes, because the insects, by coming in contact with amounts of the chemical too small to kill, become conditioned so that they can withstand increasingly large doses. Comparing the situation to morphine addiction, he said:

"At first a person can tolerate only a small amount of morphine. But ever larger amounts are necessary for a 'kick.' Eventually, a person can take 100 times his first dose, and still he won't feel it."

Animals receiving small amounts of DDT are able to handle the poison by storing it in the fat tissues of the body,

he said. In insects, the DDT might be transmitted in the fat content of the eggs maturing in the bodies of the females.

Old DDT deposits are probably the source of the chemical making insects resistant, Dr Fay speculated.

Reports from Egypt, Greece, Italy, Sweden and Denmark as well as the United States show that house flies have shown resistance to DDT. Two species of pest mosquitoes in this country, one in Florida, the other in California, have also been reported DDT-resistant. One species of *Anopheles* mosquito, the malaria carrier, is not being controlled to the same degree in South America as in former years, Dr Fay reported.

"In contrast to these observations," he said, "we have *Anopheles* species which are still showing no resistance to DDT after periods of four and five years of control programs. Programs involving the control of fleas, blow flies, stable flies and horn flies are still showing good results."

If adult flies of field strains are held in the laboratory, free from any insecticidal deposits, Dr Fay said, resistance disappears completely in four to 10 generations.

Science News Letter, December 24, 1949

MEDICINE

Vitamin B₁₂ Aids Growth

The growth of undernourished children is stimulated by daily doses of vitamin B₁₂. This vitamin has been used chiefly before for its good effects in anemia and sprue.

► A NEW way to make puny, undernourished children grow and gain has been discovered by scientists at the Children's Fresh Air Camp and Hospital in Cleveland, Ohio.

The method consists in feeding them daily doses of a relatively new vitamin, B₁₂. Heretofore this vitamin has been known and used chiefly for its good effects in pernicious anemia and sprue, although originally it was discovered as a chemical that promoted growth in bacteria.

"Dramatic" responses by five of 11 children fed the vitamin are reported by the Cleveland scientists in the journal, *SCIENCE* (Dec. 16). The scientists are Drs. Norman C. Wetzel, Warren C. Fargo, Isabel H. Smith and Josephine Helikson.

The vitamin was fed every morning to six boys and five girls between the ages of five and 12. They were all under care

at the institution for varying degrees of malnutrition and growth failure. In addition to the vitamin doses, all the children were continued on whatever programs of rest, exercise and diet they had been following in efforts to improve their growth and physique.

Before getting the vitamin, the children had showed no characteristic or even suggestive signs in hair, skin, eyes, mouth or nervous system that could be ascribed to vitamin lack, and all were presumably getting all the vitamins needed for normal growth.

After getting the vitamin the children not only showed a change in growth rate but also had more physical vigor. They were more alert and behaved better. And they demanded second helpings, whereas before they had had poor appetites.

The "most dramatic general effects" were

shown by a boy with severe allergic bronchitis, the doctors report. For a year he had been awakened regularly at night by severe asthmatic attacks. His daytime wheezing was so bad it cut down his desire for food and even his time for eating it.

After being put on the vitamin treatment, his symptoms "simply vanished during the first week, to the surprise of every attendant, lay or professional," the scientists report.

They suggest further investigation on "what possible connections" there may be between vitamin B₁₂ and allergies.

Science News Letter, December 24, 1949

BIOCHEMISTRY

Radioactive Alcohol Is Tried on Rats

► RADIOACTIVE alcohol is the new research tool being used by scientists at the Scripps Metabolic Clinic, La Jolla, Calif., to learn more about how your body handles the alcohol in your Christmas eggnog, cocktails or other alcoholic drinks.

A large part, 75%, of the alcohol is burned to carbon dioxide within five hours. Almost all of it, 90%, is burned in 10 hours, they find.

The studies were made on rats. Some were normal rats and others had been "habituated" to alcohol in their diet and might therefore be considered something like some humans who have developed a type of tolerance to alcohol.

The habituated rats, however, did not burn alcohol any faster than the teetotallers among the animals. This suggests that tolerance is a matter of decreased nerve sensitivity rather than increased ability to dispose of alcohol.

Surprising to the scientists was the finding that the kidneys have a high capacity for oxidizing, or burning, alcohol. Heretofore it has been generally concluded that the kidney did not take part in the first stages of alcohol burning, and that this went on almost exclusively in the liver. Rats may be different from other animals in this regard, the scientists suggest, but they think it more likely that the kidney's alcohol-burning activity has been overlooked. The rat has about seven times as much liver tissue as kidney and this would give the rat liver a four-to-eight-fold advantage over the kidney in ability to burn alcohol.

The radioactive alcohol was made by fermentation with baker's yeast of corn syrup containing radioactive carbon 14. When the alcohol was burned in the rat's body to carbon dioxide, the radioactive carbon 14 in the carbon dioxide gave the scientists an accurate measure of the rate of burning of the alcohol.

The studies are reported by Dr. Grant R. Bartlett and Harry N. Barnett of the Scripps Metabolic Clinic in the *QUARTERLY JOURNAL OF ALCOHOL STUDIES* (Dec.).

Science News Letter, December 24, 1949

MEDICINE

New Relief for Arthritics

A gland chemical and vitamin combination may substitute for cortisone and ACTH in arthritic treatment. Good results of this treatment are reported.

➤ A COMBINATION of a plentiful gland chemical and a vitamin may become a substitute for scarce cortisone and ACTH in treatment of arthritis

Good results with this treatment are reported by Drs E Lewin and E Wassen, of Sahlgren's Hospital, Gothenburg, Sweden, in the LANCET (Nov 26), British medical journal

The gland chemical they used is from the adrenal gland cortex, which is also the source of cortisone. But it is a different chemical, known as desoxycorticosterone acetate. The vitamin is ascorbic acid, or vitamin C.

Both vitamin and gland chemical were given by injection, the gland chemical into the muscles and the vitamin into the veins. Within five minutes joint pain in arthritis patients began to ease and the joints could be moved more readily. Fifteen to 20 minutes later, the pain had practically disappeared. The joints could be moved as much as the wasting of muscles and changes in the joints from the disease would allow.

All of the nine patients given this treatment reacted in the same way.

"In some cases the improvement was astounding," the Swedish doctors report. "One of the patients was completely crippled by pain and contractures after rheumatoid arthritis for 15 years. After one combined injection, she sat up with ease and moved her arms and legs about freely. All her pain had gone. It was noted that the skin became warmer and redder in the articular (joint) regions after the injection."

"Some patients became greatly exhilarated after the injections, more than one would expect," the doctors state, "from the mere relief of pain."

"The effect lasted from one to six hours, occasionally more than 24 hours. It seems as though it lasts longer with each further injection. In more acute cases one or two injections have been enough to banish the pain for two or three weeks (the present observation period)."

The good results with desoxycorticosterone are "unexpected," the LANCET editor points out. The Canadian scientist, Dr. Hans Selye of Montreal, has found that rats treated with this hormone over a long period often developed arthritis.

An American scientist, Dr. Edward F. Rosenberg of Chicago, tried this hormone in arthritis patients and found it of no benefit.

The Swedish doctors seem to have changed this chemical's action "profoundly",

the LANCET editor states, by giving it with vitamin C. But the editor warns that much more work will be needed before their observations on patients can be reconciled with Dr. Selye's experimental work.

If the Swedish doctors' results are confirmed, the editor states, "the discovery will be a great step forward" because desoxy-

corticosterone is made synthetically and is relatively plentiful, as is also vitamin C, whereas both cortisone and ACTH are rare and likely to remain so.

Vitamin C, the Swedish doctors found, was not effective in combination with the gland chemical when the vitamin was given by mouth.

Relief obtained from the combined treatment lasted four days after a pellet, or pill, of the gland chemical was implanted in the muscles of the patient and the vitamin injections were given every sixth to eighth hour. At the time of their report this had been tried only in one patient and only four days had elapsed since the pellet was planted in the patient's body.

Science News Letter, December 24, 1949

GENERAL SCIENCE

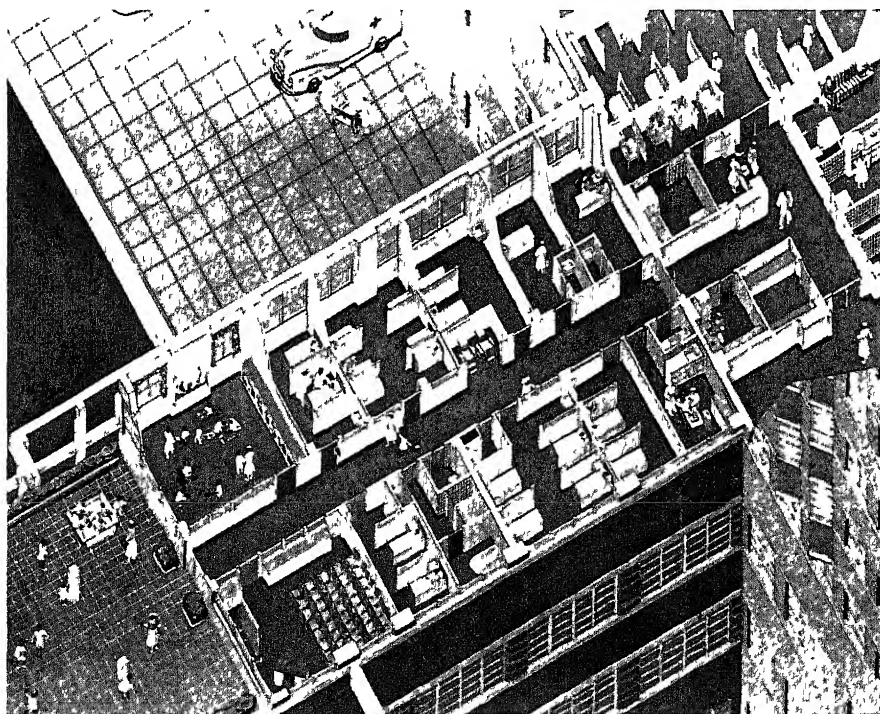
Unified Science Is Possible

➤ THE welding together of all the sciences into one "unified science" lies in the imminent future. It is being made possible by the discovery of certain principles of interaction between things, beings, and groups, which are applicable to all sciences.

These ideas were presented at Yale University's Osborn Biological Laboratory in New Haven, Conn., by Edward F. Haskell,

research associate of the Foundation for Integrated Education.

By reducing the basic axioms and concepts of a given science, such as biology, to mathematical values, it is possible, Mr. Haskell said, to plot them geometrically, on a graph. This graph, which he calls a "coaction rose", is basically two straight lines at right angles to each other, like the



FOR CHILD CANCER VICTIMS—The proposed Children's Wing at Memorial Cancer Center, New York City, as shown above in three-dimensional drawing, is part of the expansion program planned by Memorial Cancer Center. John D. Rockefeller, Jr., has pledged a donation of \$2,000,000 toward the \$5,250,000 construction and teaching program, contingent upon the raising of a matching sum by the Center.

four quarters of a mariner's compass. On it he plots the interactions (coactions) of various scientific principles.

This kind of analysis, Mr. Haskell said, shows that such sciences as genetics, systematic biology, and sociology naturally fall into classifications comparable to the periodic table of chemistry.

"It is likely that today, in 1949, we stand before a development of biology and social science comparable to that of chemistry in and after 1869, the year Dmitri Mendeleev invented, or discovered, the natural classification of the chemical elements," he said.

He pointed out that the "mathematization" of conventional scientific terms is unifying scientific theories today in much the same way that the mathematical equations of Clerk Maxwell, the 19th century British physicist, unified the sciences of light, magnetism, and electricity.

Mr. Haskell is chairman of the organizing committee of the Council for Unified Research and Experimentation. His lecture, entitled "The Emergence of Unified Science, (The Appearance of Mendeleev's Periodic Law in Genetics, Systematic Biology, and Sociology)," was given under the auspices of the Foundation for Integrated Education.

Science News Letter, December 24, 1949

HORTICULTURE

Scientist To Spend 92nd Birthday in African Jungle

► **LIBERTY** Hyde Bailey, the greatest authority on palm trees, garden plants and blackberry bushes in the world, will spend his 92nd birthday next March while on an expedition in the jungles of Africa. He plans to bring back with him rare specimens of palms to add to the collection of 150,000 plants in the Bailey Hortorium at Cornell University. "Hortorium" was a new word, manufactured by Dr. Bailey, which he felt more accurately described his collection than "herbarium."

Long and sometimes dangerous plant collecting trips are no novelty to the still

vigorous horticulturist. He spent his 90th birthday alone on an island in the Caribbean, his 89th somewhere up the Amazon River in Brazil.

Dr. Bailey plans to take off by plane sometime next month for Africa, and he'll probably go alone. As to just how he proceeds after he gets there, he doesn't know. "I can organize the trip after I get there," he said. "There is no rush."

Officials at the Bailey Hortorium aren't worried about his lack of plans, however. Dr. Bailey has traveled 250,000 miles in his long lifetime and he has collected 275,000 plant specimens.

In addition to his travels all over this country, in South America, China and New Zealand, Dr. Bailey has found time to be the pioneer of modern agricultural educational methods, to edit 156 books about plants, to edit a magazine and to engage in plant breeding and experimentation. He accomplished all this because at an early age he planned his own life program: 25 years of study, 25 years of teaching and 25 years to do whatever interested him most.

Now well into his fourth 25-year hitch, Dr. Bailey is still enjoying himself, still traveling and still collecting plants.

Science News Letter, December 24, 1949

GENERAL SCIENCE

Eva the Engineer Must Remember To Be Eve

► **EVA** the Engineer will do all right in such a masculine profession as engineering if she remembers to be Eve first of all and an engineer secondly.

This advice comes from a woman who apparently has followed it herself and avoided lonely spinsterhood and being thought "a little queer." She is Mrs. Florence F. Buckland, heat transfer and fluid flow consultant in the General Electric Engineering and Consulting Laboratory.

She also advised teachers and textbook writers to take the feminine viewpoint, remembering that "electricity, heat and op-

tics might be explained in terms of sewing machine motors, cooking and moonlight" and that the properties of matter apply to a cake of soap as well as to a chunk of iron.

Mrs. Buckland's ideas on engineering as a career for women were presented at the meeting in New York of the American Society of Mechanical Engineers.

Science News Letter, December 24, 1949

Chromium, essential in stainless steel and widely used in other applications, is largely imported, the United States producing only about 1% of what it uses.

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GENERAL SCIENCE

Science Review for 1949

Russia's atomic explosion, cortisone and ACTH for arthritis treatment and giant accelerators are among the top science highlights of the year.

This summary of the year's happenings in the world of science is limited by space to just the highlights. Most of the events are described in detail in the pages of SCIENCE NEWS LETTER for the current year. If you wish to refer to any particular report, you may find it readily through the index. (See SNL, June 25 and also the issue which will appear next week, Dec. 31)

By SCIENCE SERVICE STAFF

► THE atomic explosion in Russia, if it set the world stage for war, is the top research development of 1949, expected though it has been. Consequences of Soviet conquest of atomic energy may wreck our civilization and major scientific progress if the Russians use it for aggression. If, as claimed, they intend to use atomic explosions for peaceful engineering purposes only, then another explosion is unimportant.

Top achievements in health for the world are: Demonstration that cortisone and ACTH, glandular products, treat arthritis effectively and promise aid in other diseases, notably mental ills. Anti-allergy drugs, antagonistic to histamine, promise to relieve symptoms of colds—one of the great causes of human discomfort and loss of working time. Another related drug, dramamine, was found to relieve the discomfort of sea and air sickness and other nausea.

Jet and rocket developments for war and peace, although largely secret, probably lead the aviation research progress, but the non-stop circling of the globe by an Army plane is a reminder of our shrinking world.

Top chemical achievements are progress in fluorocarbons which promise improved materials such as lubricants, and the synthesis of chloromycetin, first antibiotic to be so produced commercially.

Two classes of giant machines of the laboratory, accelerators and electronic computers, brought us closer to greater control over matter. The accelerators—cyclotrons and the like—are building and going into service to probe the very nature of matter and its fundamental particles. The giant "electronic brains" are starting to solve a variety of problems including flight of guided missiles and use of other weapons as well as industrial and scientific developments.

Evidences of men in Alaska older than any previously found in America and contemporaneous with the Cro-Magnon in Europe were unearthed and added to our pre-history.

There was increasing research on capturing the energy of the sunshine, with one tack the use of algae and yeast to produce food and chemicals and the other fundamental investigation of the process of photosynthesis in the plant in order to duplicate it in the factory.

AERONAUTICS

"Sky Compass" Is Useful In Polar Regions

A "sky compass," making use of polaroid and cellophane, and useful during twilight periods in polar regions, was developed.

An informal record was set by the airplane "Lucky Lady II" when it flew non-stop around the world in 94 hours and one minute, being refueled in the air.

Achievement in supersonic speed was recognized with award of the Collier Trophy to John Stack, research scientist of the N. A. C. A., Lawrence D. Bell, president of Bell Company, maker of supersonic plane, and Capt. Charles E. Yeager, pilot of the plane on its first supersonic flight.

The Delta-wing airplane, with radically different design of sweep-back wings, reached the test stage.

A slow plane that can land on a tennis court was developed.

A helicopter with ram-jet engines on the tips of its lifting rotary blades was under construction, one—"The Little Henry"—was flown.

A rocket motor utilizing liquid hydrogen for fuel and liquid oxygen as oxidizing agent was successful in experimental use.

Mid-air refueling was demonstrated to be practicable for commercial and military planes by a round-the-world non-stop flight and by a jet fighter which remained in the air for 12 hours.

Flight service in bad weather was facilitated by two new airport lighting systems, one using krypton lights, and the other with variable intensity lights regulated at request of incoming pilot.

The CAA-developed Instrument Landing System and the radar-radio system known as Ground Controlled Approach were approved as standards for world-wide use.

FIDO, the fog-dispersing system, was installed for the first time commercially, at Los Angeles Airport.

A stall-proof automatic pilot capable of flying in all sorts of weather and of making instrument landings was tested.

Wing-up domes in bomb-like casings, called "radomes", for housing radar equipment and antennas, were successfully tested.

Cross-wind landing gear, which permits safe landings regardless of the direction of the wind, was certified for use with DC-3 planes.

An oxygen converter system was developed that permits the use of oxygen in liquid form for airplane crews and passengers.

A prone-position pilot bed to lessen flying

fatigue in a jet plane and prevent ill effects from acceleration was developed.

Location of new type radio antennas under the skin of airplanes, saved up to 600 horsepower for propulsion purposes in some of the larger planes.

A new wind tunnel for testing models of missiles, attained the highest recorded air velocity, ten times the speed of sound.

The world's largest supersonic wind tunnel, with test section measuring six by eight feet, and which will accommodate a full-scale jet engine under actual operating conditions, was put in operation and found capable of speeds up to twice that of sound.

A new type wind tunnel, a straight-through type with air current provided by a standard turbo-jet engine, was developed.

Two new guided missiles, No. 774 and NATIV, were fired successfully.

A program was started to recover instruments in rocket warheads by parachute.

"Flying boom" in-flight refueling system utilized telescoping pipe.

A Joint Long Range Proving Ground was established at Banana River, Fla.

Camp Forrest, Tenn., selected as site of an Air Engineering Development Center.

ANTHROPOLOGY-ARCHAEOLOGY

Stone Age Alaskan Linked With Cro-Magnon Man

Burins, evidence of an Old Stone Age culture similar to that of Cro-Magnon Man in Europe, were unearthed in Arctic Alaska in the dwelling sites of what were probably America's first inhabitants.

Additional evidence that the first Americans migrated from Asia were mesolithic stone implements like some previously found in the Gobi Desert.

Traces of habitation of some of America's



PILOT BED—H. T. Hertzberg, chief of the Anthropometric Unit, demonstrates the prone position pilot bed which eliminates flying fatigue common with the ordinary sitting position and increases tolerance of pilots to gravitational pull.

oldest inhabitants, Folsom Man, were unearthed in Virginia and northern North Carolina.

Evidence was found indicating that although Yuma man lived in America before Folsom man he continued throughout the Folsom period, making them contemporaries.

Metallographic study of ancient iron objects found in prehistoric sites in Virginia and Ohio provided evidence that iron may have been worked in America in pre-Columbian days.

An ancient "lost city" which had been a flourishing city of about 100,000 population at the time of the Crusades and is still remarkably well preserved, was found in the Seistan area of Afghanistan.

Man's earliest realistic portrait was found in the form of a 12,000-year-old stone work of art making use of painting, engraving and sculpture, discovered in a cave at Angles-sur-l'Anglin, France.

Newly discovered ape-men of South Africa were shown to have crushed baboon skulls caused by animal bones serving as clubs.

The buffalo grass growth on the Great Plains was due to the Indian custom of periodic burning off to keep the country open, it was reported.

Famous Piltdown man, long considered one of mankind's oldest ancestors, was found to be no more than 10,000 years old instead of 100,000 to 500,000 as previously thought.

Early Stone Age tools found at the former sites of beaches in Portuguese East Africa gave information of ocean and sea level changes in the region.

Animals hunted by Old Stone Age man are portrayed by lines engraved on a large rounded pebble found in a rock shelter in eastern France.

A group of Indians, descendants of the Mayas, were found to have lost nearly two inches in height in the course of two centuries.

Evidence of a gambling place used by pre-Columbian Indians was found near the California-Nevada boundary.

Ancient bone ax-heads believed to be prototypes for Neolithic man's stone ax-head were discovered on the west bank of the Nile.

Drawing of a whale hunt on a 500-year-old snow knife found in the Canadian Arctic provided evidence of a vanished people and of changes in ice conditions and altered ocean currents.

ASTRONOMY

Minor Planet Found To Pass Closest to Sun

A minor planet or asteroid was found to have a path which apparently takes it closer to the sun than any previously charted, promising to give important data for the studies of the solar system.

A second satellite of Neptune was discovered.

Demonstration was made of the absence of a lunar eclipse effect when observations are made by radar in wavelengths of 1.25 cm, indicating that the moon is covered with a non-conducting layer of dust.

Discovery of bright line radiation in the spectra of objects previously identified as globular clusters showed that they are apparently Pleiades-like groups composed of stars and nebulosity in the Andromeda Nebula.

Dim stars broadcast to the earth a short-wave radio noise that was received with special antenna.

Construction was begun on a 50-foot radio mirror which will be used in connection with a sensitive radio receiver to pick up cosmic static.

Two cooperating institutions began a survey

of the brightest stars of the Milky Way up to a distance of 32,000 light years, photographing fields of stars through an objective prism used with the Schmidt telescope.

Great clouds of matter in the space between the stars are relatively uniform in composition, it was indicated by the uniformity of H and K spectrum lines of various stars.

Three novae were reported, one in the constellation Cetus and thought to be our second nearest star neighbor in space, another in Scorpius, and the third in Scutius, one discovered nine years ago was confirmed.

Twenty millionths of an inch of glass hampering the big glass eye of Palomar had to be polished away before the giant eye could have another try at probing the great unknown, the 48-inch Schmidt telescope helped to lay the groundwork for the 200-inch Hale telescope.

The giant, 98-inch glass mirror for the largest telescope in the world outside of the United States was presented to Britain's Royal Greenwich Observatory by the McGregor Fund of Detroit.

The Radcliffe 74-inch reflector at Pretoria, South Africa, started operation.

Purchase was made by Lick Observatory of a 120-inch glass blank for a new 120-inch reflecting telescope.

Six new comets were discovered.

Some clusters of stars in the Milky Way galaxy were reported to be disintegrating while others were becoming denser and more strongly clustered than ever.

Low-frequency radar was used to detect fast-moving meteors.

A photographic study of meteors was begun, showing as one of the first results that the density of the atmosphere 45 miles or so above the earth increases in summer and decreases in winter.

Yellowish lemon-shaped stars were reported to be possible planetary ancestors of other planetary systems.

A noisy zone millions of miles deep was advanced as the mechanism whereby giant red stars with intensely hot centers are able to exist.

A new electronic plate-measuring machine to

help discover what makes up the stars was announced.

The latest theory on the origin of the earth stated that the earth was once a pancake of gas and dust rotating around the sun.

The theory that comet heads were formed from the melting of various ices of common gases, starting in the outer reaches of the solar system and mixed with meteoric particles was proposed.

A photographic survey of the sky using the 48-inch wide-angled Schmidt telescope, of which the plates are to be utilized in the production of a sky atlas, was begun.

A "vacuum ultraviolet" emulsion useful for studying the sun from rockets sent high into our atmosphere was developed.

BIOLOGICAL SCIENCES

Algae Were Studied as a Substitute for Food

A freshwater alga, *Chlorella*, as well as yeasts and seaweed were studied as possible substitute foods for man and animals to avert future famines.

Fertilized ova from artificially inseminated pedigreed cows were successfully implanted in the bodies of scrub cows.

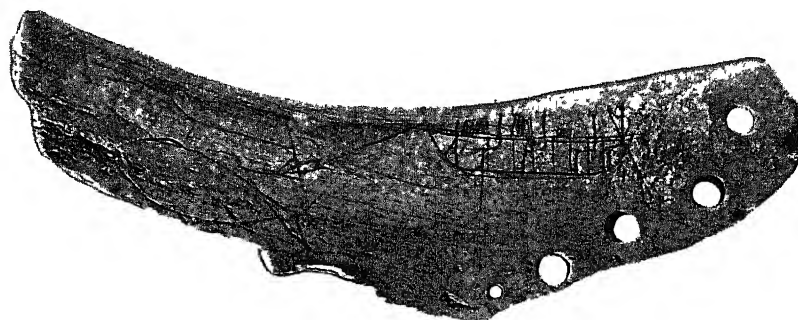
Virgin heifers and barren cows were induced to give milk by burying tablets of the synthetic female hormone diethylstilbestrol under their skins.

Treatment with a female sex hormone, stilbestrol, with iodinated casein or thyroxin, made pigs into bigger porkers on less feed.

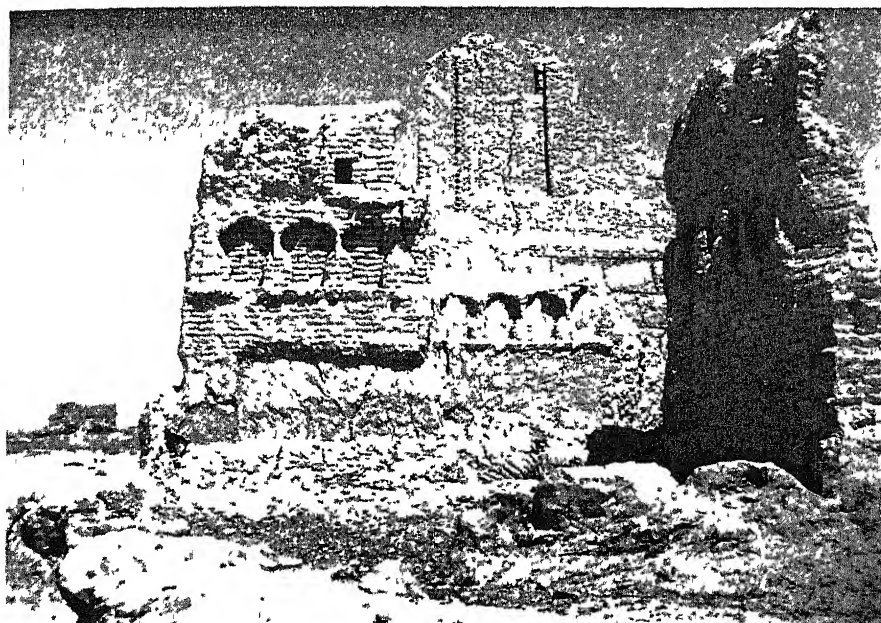
A blood group in dogs, which, like Rh in humans, may cause jaundice in the young through incompatibility with the mother, was found and named Do.

Early-stage embryos of mice with cells containing three times the basic number of chromosomes were obtained, the first ever reported in mammals.

The cause of swine enteritis, which produces runt pigs, was found to be deficiency of B



CLUE TO VANISHED PEOPLE—The drawing made on a snow knife shows five men in a typical Eskimo boat on a whale hunt. The drawing was made by an unknown artist some 500 years ago and points to the fact that once a vanished people lived on Cornwallis Island in the Canadian Arctic Archipelago.



CITY DISCOVERED—A "lost city" in the remote desert region of Afghanistan was found. The deserted city is believed by scientists to have flourished in the twelfth century.

vitamins, it was cured by vitamin injection

A female sex hormone was found in fresh young spring grass, which may account for the larger milk yield of cows at that time of year

Amino acids from urea can be produced in the rumen of cud-chewing animals, it was found

A cheaper vaccine for the protection of livestock against foot-and-mouth disease was made by culturing the virus on the lining of the rumen

Hornets were found to be useful in tracing radioactive leaks because of their trait of accumulating barium in their bodies, periodic killing and analysis of some of the insects reveals pollution of the plants of the neighborhood

Proof was found that mosquitoes carry the virus of eastern equine encephalomyelitis

An inbred strain of corn that produces no pollen was developed, making it possible to grow hybrid seed corn without the laborious and often injurious detasseling process

Use of hormone sprays reduced the dropping of apples before harvest

Coconut milk was found to contain a still-unidentified substance which stimulates plant growth

The seaweed *Laminaria* produces a growth-control substance in much the same manner as higher plants, it was found

High aroma, low nicotine "Turkish" type tobaccos have been successfully grown in the United States

Carbon black was successfully used to raise soil temperature by increased heat absorption from the sun

Uranium in the form of its nitrate salt was found to cause hereditary changes in widely different kinds of fungi

Two new insecticides, benzene hexachloride and gammexane, or 666, were found to cause hereditary changes in plants through multiplying the number of chromosomes

DFDT, apple-scented German cousin to DDT, was found to be a better killer of houseflies

than DDT and less toxic to warm-blooded animals and fish

Pyrethrum was synthesized for insect sprays with more killing power than the natural product

The aquatic plant pest, water hyacinth, can be controlled by spraying with 2,4-D, it was found

DDT-resistant strains of flies were found to require 50 times the normal dose of DDT to kill them

DDT resistant strains of flies and mosquitoes were found

TCA was found to be effective in eradicating quack-grass and Johnson grass as well as prickly-pear cactus, but causes a temporary soil sterility

Compound 42, chemical relative of dicoumarol, was found in field tests to be an effective rat killer, causing fatal abdominal bleeding

Sudden reduction of osmotic pressure kills certain viruses by "osmotic shock," leaving them "ghosts," that is, empty head membranes with tails attached, it was found

Actidione, antibiotic derived from the same fungus that produces streptomycin, was found effective against plant-disease fungi

"Caesarian" operations saved valuable hybrid plant embryos, removing the immature embryos from abnormally developing seed capsules

Micrografting was used to save valuable hybrid plants so weak they couldn't break through the seed-coat normally, attaching them to the stems of stronger, related plants and protecting them in a gelatine capsule

The seed-pod of the cascote tree of Mexico was found to rival the South American quebracho as a source of leather-tanning tannin and as an oil-drill lubricant

A starch substitute for sizing textiles was found in a wild onion of India

Seedless figs were produced in half the usual time, by dispensing with wasp pollination, and by spraying instead with the synthetic hormone, 2,4,5,-T

Plants with large, deep root systems, like corn, make less use of fertilizer phosphorus than

do plants with more limited root systems like potatoes, experiments with radioactive phosphorus showed

Phony peach disease was found to be carried by four related species of leaf hoppers

The elementary particles, or molecules, of cellulose, consisting of small equal-sized rods, were discovered with the aid of the electron microscope

A new method of spreading chromosomes for photography under the electron microscope brought the genes one step nearer to positive identification

A micro-analysis apparatus was developed which measures the minute quantities of various chemicals present in a cell nucleus

The virus of mosaic disease in tobacco showed up as tight sheaves of needle-like particles in electron microscope photos

New preparation techniques enabled biologists to study the nuclei and flagella of bacteria cells under the electron microscope

The first international congress of biochemistry was held in August at Cambridge, England

The giant African snail, a plant pest, was detected in 15 shipments at American ports, and was destroyed in all cases

More flavorful fruit juices were made possible by development of a process for extraction through distillation of the "essence" of the fruit

Elephant seals, once thought extinct, are increasing in numbers off the coast of Mexico

Hutias, big rodents thought to be extinct, were found living in Haiti.

CHEMISTRY AND PHYSICS

New Atom Smashers Were Completed This Year

Several new atom smashers were completed or under construction during the year, among them a 6,000,000-electron-volt bevatron, model of larger machine planned, a 300,000,000-electron-volt synchrotron at the University of California; a 70,000,000-volt synchrotron at the U of C Medical School devoted to medical research, another 300,000,000-electron-volt non-ferro-magnetic synchrotron at General Electric Company, a 50,000,000-volt betatron for the National Bureau of Standards to develop standards for X-ray dosage, a 300,000,000-volt betatron for the University of Illinois; a 300,000,000-volt synchrotron for Purdue University, a 3,500,000-electron-volt electrostatic accelerator for Brookhaven National Laboratory, a baby 9,000,000-electron-volt betatron for Holland, and an "in-between" 125,000,000-electron-volt synchro-cyclotron for Harvard

News was received in the United States of an atomic explosion in Russia

An instrument for detecting air-borne contaminants was developed, consisting of a jet through which air samples are drawn and their particles deposited on a revolving glass disk

Creation of mesons by radiation in the 300,000,000-electron-volt synchrotron was first direct evidence that these cosmic ray particles can be made from electromagnetic radiation, as well as by high-speed alpha particles

Immense explosive showers of atomic fragments a mile across, each thought to be caused by a single atomic bullet from outer space, were discovered in the earth's atmosphere

Nearly a third of the total mass of the projectiles in the cosmic rays from outer space consist of hearts of heavy atoms ranging from carbon to molybdenum, stripped of their electrons

Superballoons of welded polyethylene plastic

were developed to carry scientific apparatus weighing as much as two men to new heights above the earth

A new magnetic iron-nickel alloy, Orthanol, proved superior for use in magnetic amplifiers instead of the delicate electronic tube

A method for making shadow photographs under the electron microscope of the direction and strength of the fields of minute "atomic magnets" within magnetic materials provided a new tool for fundamental research in physics

The idea was proposed that space between the stars may be filled with tiny, magnetic needles of iron in giant magnetic fields

Radio microwaves were used to find the dimensions and spin-rate of certain molecules in gases by the absorption of the rays passed through the gas

Zirconium was found to be suitable as a structural material for building atomic energy piles

Small-lot production of titanium metal was applied commercially

A ten-minute warning that an atomic bomb will drop can reduce the casualties of a normal city ready for atomic attack from 100,000 to 10,000, it was estimated

A new atomic particle, the negative proton, was predicted

The Nobel Prize in physics was awarded to Dr. Hideki Yukawa who predicted the existence of the meson three years before it was found in experiments with cosmic rays

Platinum with mass 190 was discovered and two other stable isotopes were predicted tellurium 118, gadolinium 150

A polarizer for infra-red rays in sheet form was invented

A supermicroscope that "sees" with mirrors made possible use of infra-red rays for spectral analysis and identification of chemicals, plans were made for the manufacture of this instrument in the United States

A radiation detector for disaster use in bombed areas where amount of radiation would swamp a Geiger counter was put into commercial production.

An atomic clock which tells time by the movements of atoms in molecules of ammonia was put in action

A new theoretical approach was proposed for reconciling the relativity theory of Einstein with quantum mechanics, emphasizing position in the case of macroscopic worlds and velocity inside the atom

The "scintillation counter" is a new device developed for detecting radioactive radiations

Soft X-rays were found in the upper atmosphere by V-2 rocket exploration and believed responsible for the ionosphere

Radioactive elements do not speed plant growth, it was established

Methods of disposing of dangerous atomic wastes by having bacteria absorb them and by incorporating them in concrete were developed

New use was found for the atomic furnace, or chain-reacting neutron pile, in measuring the amount of chemical element in an unknown material through the activity induced

New semiconductors were produced by irradiation of germanium in the atomic pile with slow neutrons, thus creating a predictable number of impurity centers in the material itself

An ultraviolet microscope was developed which makes photographs in color, making possible contrast effects without the use of chemical stains

A new technique was developed for thin slicing for preparations for the electron microscope which makes slices so thin that 4,000 would be only the thickness of a human hair

Several theories were advanced to account for

the birth of cosmic rays one that great clouds of dust in interstellar space create magnetic fields in which a particle may gain energy, another that the energy comes from tremendous explosions of supernovae

Molten zirconium at a temperature near 6,500 degrees Fahrenheit provides the light in a new lamp developed for use in photography, projection and television

The Neg'ator, a mechanical spring that resists less the more it is deformed, was developed

A new method of taking photographs by use of a screen coated with specially prepared phosphors, and called thermo-radiography, was developed

Better synthetic rubbers were produced which are resistant to extreme heat and Arctic cold and which will not deform materially under the weight of vibrating machines

By international agreement, the name of the element tungsten was changed to wolfram, columbium to niobium, and agreement was reached on what to call other elements going by different names in different countries

An unexpected source of chemical energy was found present in the atomic piles when potassium chloride was changed to potassium sulfate, a highly oxidized material capable of reducing other substances

New facilities for the production of plutonium were put into operation at Hanford, Wash.

A new method of making acetylene from methane, making use of electric current, was announced.

Quartz crystals produced synthetically were found to be better than the natural ones

The all-synthetic fiber, dynel, the short staple form of vinyon, was announced

Orlon, a new synthetic yarn from natural gas, oxygen and nitrogen from the atmosphere was developed and found to be resistant to sunlight, moisture, fungus and insects

A new process was developed for making metal films, so thin that they can be used as supporting membranes for electron microscopic studies

Crystals of calcium tungstate were made synthetically in water-white pure form

The Nobel Prize in chemistry was awarded to Dr. William F. Giauque, world pioneer in low temperature research

New detergents called morpholinium alkyl sulfates which not only cleanse but kill germs were produced

Higher gasoline yields, lower butane and gas yields, and somewhat lower gasoline octane numbers were obtained with silica-magnesia cracking catalyst

A wool-like synthetic fiber was made from cottonseed protein

Thermoluminescence was found to be a sensitive test for radioactivity in rocks of the earth

It was made possible to re-use photographic wash water over and over by a water purification method using ion exchange

Starch was converted into sugar by polarized infra-red light

A new lubricant of unprecedented stability and a chemically inert plastic were applications made of a new family of organic chemical compounds, the fluorocarbons

Synthetic seaweed fibers were used to weave light delicate fabrics from which the seaweed-like fibers are removed by washing out

An isotope of nitrogen with mass 12 was discovered by bombarding carbon with high energy protons from a linear accelerator

Spectrographic study revealed in the upper atmosphere two kinds of carbon dioxide, one composed of two atoms of oxygen to one of heavy carbon, the other composed of one atom

of ordinary carbon to one of ordinary oxygen and one of heavy oxygen

Infra-red studies revealed that long heat waves can pass blocks of purest germanium of considerable thickness

EARTH SCIENCES

Fuel Was Obtained from Unmined Coal

A process was developed for obtaining fuel gases from unmined coal by sending an electric current through it

A one-step method for getting high-grade gasoline from low-grade crude oil without use of high pressure was devised

The theory that the earth's magnetic field may be due to the gravity pull of the earth as it spins on its axis was advanced

A one-pound Geiger counter was developed in Canada for uranium prospecting

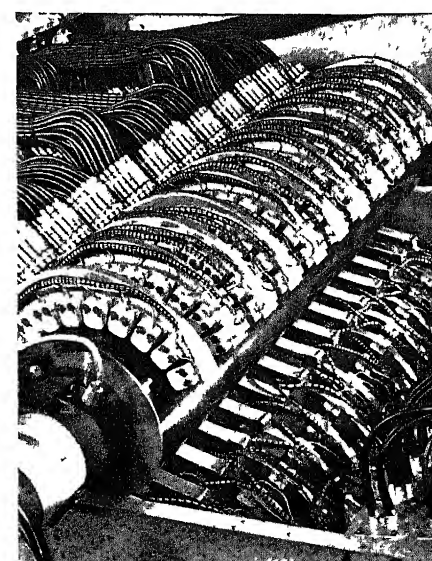
An industrial seismograph was devised, it is about the size of a box camera and used to measure vibration in machinery

In carefully controlled experiments to produce precipitation by seeding cumulus type clouds with dry ice, the most obvious result was dissipation rather than rain-producing development

A new cloud analyzer which measures the height of a cloud at its summit as well as at its base and indicates the density, was developed

Fossils of three different races of ape-men were found in South Africa, one of giants two and one-half times as big as today's average human being, another a race of small, gracefully built ape-men weighing about 100 pounds each, and a third type more nearly human than some of those previously found

Measurement of the heavy oxygen present in fossils from upper Cretaceous chalk deposits of England and comparison with that in the sea water showed that a hundred million years



HARVARD MARK III—The magnetic drum memory organ of this computer has many pick-up heads and wires that are the electric nerves leading in to the rest of the computer.



ACTH SOURCE—The pituitary gland from which ACTH is made is encased in a bony structure at the base of the hog's skull. To remove the gland which is the size of a grain of corn, the operator uses a power-driven knife to split the skull. The indentation in the knife avoids injuring the pituitary or the brain.

ago the ocean off western Europe was warmer than it is now

Discovery of fossils of ancient shark spines in South America set back the estimated age of rock formations by 100,000,000 years

Skeleton of a 150,000,000-year old phytosaur, crocodile-like animal, was found

Fossils, 75,000,000 years old, of ancient animal life five or more times the usual size were found in Mississippi

Radioactive carbon was found to be effective in measuring the age of anything that has been alive within the past 20,000 to 25,000 years

A "blister" hypothesis of mountain formation suggested that slow-working atomic energy pushed up the earth's crust

The Hawaiian volcano Mauna Loa erupted unexpectedly but harmlessly

There were 120 earthquakes of sufficient strength to record themselves on seismographs so they could be immediately located, one in Ecuador was extremely destructive to life and property and other destructive quakes occurred in Chile and Washington, the latter being the worst quake in the history of the Pacific Northwest

A new scientific organization, the American Geological Institute, was formed

Using samples of air collected by V-2 rockets, it was determined that the composition of air 42 miles above the earth is the same as that at the surface

The Atlantic ocean bottom was determined to be about 500,000,000 years old, more than seven times older than previous estimates

The earth's magnetic field was revealed to have remained practically the same for at least 100,000,000 years.

ENGINEERING AND TECHNOLOGY

A Rubber Road Surface Underwent Tests

A road surface of powdered natural rubber in asphalt was tested

Plastic foam, the world's lightest solid, made by heating a molasses-like synthetic resin, was developed for heat insulating

A new synthetic fiber, a metal-carboxymethyl-cellulose from wood or cotton, was developed for textile use

America's first gas turbine-electric locomotive entered actual railroad service

Cheap softwoods were made into hardwood by a heat-pressure process utilizing the natural lignin in the wood as the cementing agent

The magnetic fluid clutch found application in a new servo-mechanism used for power steering of airplanes and other mechanisms

New developments in electronic computers were the application of the electronic brains to problems of present day civilization ranging from economics to supersonic flight, a faster smaller computer for office work, a computer featuring a "memory system" capable of storing 64,000 digits, and a machine capable of playing chess which helped in solution of engineering problems

UNIVAC, an electronic computing machine, could be utilized as a fail-safe librarian machine with "probability coding", it was reported.

A high-speed camera made pictures in one twenty-millionth of a second by the use of high voltage passed through the electrodes of a cell which in conjunction with polarized light acted as an electrical shutter

A heat treatment gave quartz crystals, essential in radio and television, a long life without deterioration

A rotating carbon disk replaced the conventional negative rod in a new type of arc lamp which gives greater life and brilliancy

High-quality coke briquettes and gases that could be converted into gasoline and diesel oil were produced from non-coking coal by a new electrical process

Cotton and rayon fabrics were flame-proofed by treatment with a chemical solution of titanium and antimony salts

Only five seconds were required to temper a metal surface by an electronic heating process

A silica substance which acts as a nearly perfect diffuser of light gave promise of replacing the inside-frosted electric incandescent bulb

The soybean yielded a tight-sticking glue called Gelsoy which can also be used for food

Quartz crystals which produce "silent" sound waves were utilized in a new laboratory ultrasonic generator

Plastics which are good insulators were made into effective conductors of electricity

Air-cooling of motion picture films in use resulted in higher screen illumination.

Television reception was improved by the new television carrier synchronization method which eliminates frequency difference

Higher power for radio broadcasting was obtained by a system which combined two transmitters with one diplexer to form a single unit.

Long-range radio transmission was aided by the discovery that the ionospheric characteristics at any point on the earth are almost identical with those at a point on the other side of the earth directly opposite

A radioactive barium isotope was used as a tracer to show the progress of oil as it traveled through hundreds of miles of pipeline.

New high voltage rectifier tubes with thorium-

tungsten filaments which are used in X-ray equipment promised a service life 50 times that of the ordinary rectifier tube

Television receivers in the mid-West were able to pick up programs on the Atlantic Coast by means of coaxial cable and relays

A bright reflective finish was given to metals without mechanical polishing by merely dipping in a mixture of acids, operated at ordinary room temperature and up to 200 degrees Fahrenheit

New developments in television were an all-electronic system of color television in which three primary colors are sent and received on the television scope at the same time, a television receiver which will pick up color broadcasting of all proposed systems and also the present black-and-white broadcasting programs

MEDICAL SCIENCES

Cortisone and ACTH Gave Relief to Arthritics

The synthetic adrenal gland hormone, cortisone, and an adrenal cortex stimulating hormone from the pituitary gland, ACTH, brought dramatic relief to sufferers from rheumatoid arthritis, showed promise in rheumatic fever, allergies and drug sensitivities, the muscle weakness condition, myasthenia gravis, certain cancerous diseases affecting lymph glands, aging processes involving collagen tissues of the body, but extreme scarcity restricts use of these hormones until new raw materials or synthetic processes can be developed

Discovery of a new blood separation technique in which fibrinogen, a blood-clotting factor, is added to the blood made possible large scale, fast separation of red and white blood cells and blood platelets from each other and from the liquid part of the blood

Dramamine, a new anti-allergy drug, was found to give relief from motion sickness, radiation sickness, migraine headaches, nausea following electric shock treatments, and nausea and vomiting in expectant mothers, but pilots were cautioned about its sleep-inducing effect

Synthesizing of chloromycetin marked the first time in history that disease-curing mold chemical, or antibiotic drug, had been synthesized on a practical basis

Aureomycin, mold remedy which can be given by mouth, has been reported effective against amebic dysentery, shingles, pemphigus, whooping cough, undulant fever acquired from goats, and is being tried against syphilis

A new antibiotic cousin of streptomycin, christened neomycin, was discovered which is active against tuberculosis germs not checked by the former drug

Pills containing anti-histamine compounds to ward off colds were released for sale over the counter without prescription.

Lead to chemical treatment of leukemia and other cancerous condition was discovered in folic acid vitamin antagonists among which are Aminopterin, An-Fol-A, and Amino-An-Fol.

A method was developed for large scale preparation of the "master substance of muscle," adenosine triphosphate, believed potentially valuable in conditions of dysfunction of muscles, particularly heart and artery muscles

A chemical found in the nuclei of cells, desoxyribonucleic acid, was shown positively to be a constituent of genes

Pearly white opalescence of blood within 24 hours after exposure to radiation was found to be a sign of impending death in rabbits and may be applicable to humans

Dry silverpermanganate coated upon a suit-

able carrier was found to prevent carbon monoxide poisoning

A new type of high blood pressure disease, for which the name Schroeder's syndrome was suggested, and a sweat salt test for detecting it were discovered

Method for producing amino acids for vein feeding cheaply on a mass scale was developed

Accidental jaundice infection from the blood of donors was established as a new compensable occupational hazard for technicians or blood bank workers

Evidence that sickle cell anemia may be the world's first molecular disease was presented

Zirconium proved an antidote for plutonium poisoning in experiments with rats.

Rat experiments revealed that lithium chloride, salt substitute, causes death by its inhibitory effect on the breakdown of glucose to lactic acid

Lead fibreglas clothing was developed as protection against radiation

Tests of a new vitamin, called B₁₄, isolated from human kidney excretions, showed its ability to check reproduction of cancer cells but increase production of red blood cells in bone marrow

Promise of safer blood and plasma transfusions followed the discovery that nitrogen mustard gas destroyed the jaundice virus

Directing high-energy particles produced by the cyclotron into the center of a cancerous mass well below the skin in mice fulfilled hope that greater ionization and cancer tissue-destroying effect would result

Animal experiments led to the first discovery that a chemical in cancer cells is responsible for disturbance of a generalized metabolic function in the thyroid gland

First use of the atom-smashing betatron in the treatment of a human cancer patient was announced

New tests for detecting cancer were looking for anti-enzyme activity of the blood, comparing the clotting rate of heated blood to which iodoacetic acid has been added with that of normal blood, detecting electrical differences between cancer tissue and normal tissue

New factor discovered in human blood, which endangers infants when their mothers lack it, has been named Cellano factor after the woman who was found without it

Isolation of a virus which produces symptoms similar to the non-paralyzing form of polio was announced

A new vitamin factor, called biocytin, was isolated from yeast

Seasonal factors in growth were demonstrated in a study of muscular strength, gains in weight tend to be greater in the fall, but gains in height, skeletal maturity and strength are greater in the spring

The Nobel peace prize was awarded to Lord Boyd Orr, Scottish nutrition authority

The Nobel Prize in medicine was awarded to Dr Egas Moniz, who discovered the sanity-restoring brain operation, and Dr Rudolph Walter Hess, for his discovery of the role of the brain stem in inducing sleep

PSYCHIATRY AND PSYCHOLOGY

Psychiatry Taught to Hospital Attendants

A new school was organized to teach psychiatry to mental hospital attendants

Roland J Brand, attendant at the Milwaukee, Wis., County Asylum was given a new award, "Psychiatric Aide of the Year"

Histamine was found to be effective in treat-

ment of the mentally ill, alone or in combination with electric shock

Failure of the adrenal glands to respond to stimulation by ACTH from the pituitary was found to lead to inadequacy of the stress-response mechanism, this may be a factor in the production of schizophrenia

Good results were reported in the trial of electroshock treatment for prevention of a return of mental illness in recovered patients

Death rate from cancer is lower among mental patients than in the general population, it was found, incidence of hay fever is also less

The \$1,500 Lester N Hofheimer Research award for outstanding accomplishment in the field of psychiatry and mental hygiene was awarded to Dr Benjamin Pasamanik for his study demonstrating the role of environmental factors on mental development

A link was found between the alpha rhythm brain waves and voluntary muscular movements, action tends to take place at the time of the peak of the alpha rhythm

Kappa brain waves—those electric signals from the brain itself that are associated with thinking—are most active when you are recalling imperfectly learned material and come in bursts as the solution of a problem is found

In general, pain shows up in brain waves as a decrease in amplitude, it was found

The newly founded American Academy for Cerebral Palsy inaugurated a brain registry where brains were accepted for neuropathological studies of cerebral palsy

On the basis of animal experimentation, regressions and fixations were explained as resulting from early learning too strongly stamped in by excessive motivation or frustration, believed also to account for unreasonable hatred of outsiders

Definite and substantial relation was found between an individual's regard for himself and his prejudice against others, both could be altered by psychotherapy

In many cases crime has its roots in bicker-

ing, nagging and other forms of tension in the home, psychological study of the families of juvenile delinquents and criminals revealed

On the average infantile paralysis does not leave pronounced after effects on the nervous habits or behavior of child patients, it was observed

Children highly prejudiced against foreigners or minority groups tend to have a biased or distorted memory of things that happen and of stories read to them, it was found

First study was completed in 10-year program of research on effects of different kinds of groups on the way people act, it was found the highest production occurs when the individuals feel identified with their work

Failure of the pre-election polls in the fall of 1948 was found to be due to failure to improve techniques to keep step with advances in psychological science

The ear was found to have an automatic means of reducing its sensitivity to noise made by the same animal

A temporary loss of sensitivity to sound was found to occur during exposure to sound at all intensities

A ten-year systematic investigation of the growth of visual functions in relations to the total make-up of infant and child was completed, defining a new field of developmental optics

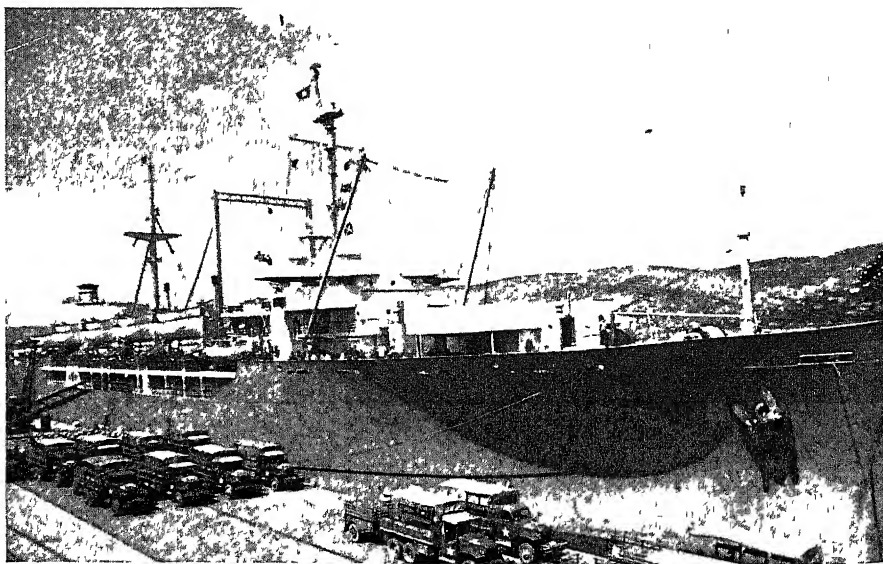
The most sensitive index point in the center of the eye was mapped and measured accurately for the first time

Glutamic acid helped some children with mongoloid mental deficiency to improve in intelligence

If a nursing mother's diet lacks thiamine, her baby may later be sub-normal in ability to learn, experiments with rats disclosed

Techniques developed for the selection of men for hazardous behind-enemy lines work during the war were applied to research on the personality factors that lead to unusual success in living

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"OPERATION SEASICKNESS"—Dramamine was under investigation on the voyage of the U. S. Army Transport General C. C. Ballou across the North Atlantic between Nov. 27 and Dec. 7, 1948. The Ballou was carrying 1,366 replacement troops en route from New York to Bremerhaven, Germany, on this extremely rough crossing which provided ideal conditions for a controlled study of motion sickness at sea.

GENERAL SCIENCE

Ten Top Science Advances

➤ THE ten most important science advances made during 1949, as picked by Watson Davis, director of Science Service, are

- 1 Atomic explosion in Russia
- 2 Hormones, cortisone and ACTH brought dramatic relief to sufferers from arthritis and promise to be useful in muscle weakness, kinds of cancer, aging disabilities and even mental illnesses
- 3 Use of anti-allergy drugs to relieve the symptoms of colds
- 4 Demonstration that dramamine relieves air and sea sickness and other nausea
- 5 Non-stop round-the-world flight of

Army bomber in 94 hours

6 Development of guided missiles, although details are still secret

7 Commercial synthesis of chloromycetin, antibiotic for disease-fighting, first chemical manufacture of such material

8 Discovery of Stone Age man in Alaska, giving man a greater antiquity in America

9 Development of fluorocarbons as a new and promising class of chemicals, useful particularly as lubricants

10 Discovery that lenses transmitting infra-red (heat) can be made from germanium metal opaque to ordinary light

Science News Letter, December 24, 1949

MEDICINE

Convulsions from Malaria

➤ EPILEPTIC convulsions and "explosive behavior" are showing up in World War II veterans who had severe tropical malaria during their war service overseas

Because vigorous anti-malaria treatment with quinine and newer drugs can rout the malaria germs before they do further damage to the brain, doctors should be on the alert to the possibility of malaria as a cause of convulsions among former service men, three physicians warn in the forthcoming issue of the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Dec 17) in Chicago, Ill. The physicians are Drs David R. Talbot, Alan C. Elerding and John O. Westwater of Wadsworth General Hospital, U. S. Veterans' Administration Center, Los Angeles.

Examples of "explosive behavior" in a

23-year-old Marine veteran of Guadalcanal given in the medical report are "manhandling his sister, threatening his father with a gun, forging a check and armed robbery of his uncle"

"At such times the patient felt 'forced' to do these things," the doctors report "Later he would realize such actions were wrong and would surrender to authorities. There was only partial memory of these events"

Brain wave diagnosis may be valuable, the doctors state, for proper diagnosis of the condition. When the trouble is due to the severe tropical type of recurrent malaria, treatment of the malaria is of primary importance. Use of anti-epilepsy or anti-convulsive drugs must play a secondary role

Science News Letter, December 24, 1949

AGRICULTURE

Aromatic Strawberries Are on the Way

➤ IF THEY could, Department of Agriculture scientists would develop strawberries complete with sugar and cream. Short of this, they are doing everything humanly possible to tickle the American palate

Their latest gustatory masterpiece is a strawberry with a mouth-watering aroma, in addition to all the other tasty qualities which have earned the strawberry its princely place on the family table. It is not yet available commercially, but preliminary tests clearly indicate that the banana split will be hard-pressed for its favored position at the soda fountain

An aromatic strawberry has been a long-standing ambition of Dr. George Darrow of the Beltsville, Md., Research Center. But it has not been easy. Patience, ingenuity and a poisonous drug have been a large

part of the story

Working with Drs. Haig Dermen and Don Scott, Dr. Darrow started out with a European strawberry that is aromatic. The initial problem was to combine its sweet-smelling quality into the American garden varieties. Unfortunately, the hybrid was sterile, producing no seeds. This was almost 15 years ago.

At this point the poisonous drug, colchicine, was applied. Colchicine is the chemical that became famous for its ability to multiply the number of chromosomes—the units in the plant cell that govern heredity. As early as 1937 Dr. Dermen successfully used colchicine to double the chromosomes of the European berry. Although this "tetraploid" European berry was patiently crossed in every imaginable way with the American variety, it was not until now that it produced fertile hybrids. It is this hybrid, with aroma from its European parent and size and taste qualities from its American parent, that

Dr. Darrow thinks may have commercial possibilities

However, it may be some years before this strawberry is on the market. Now it is the task of Dr. Darrow and his colleagues to breed other necessary characters into his aromatic berry. Most important of these are, resistance to root rot and leaf spot, firmness for shipping, and adaptation to the extreme South where strawberries are extensively grown.

All this will take time. Once all these characters are bred in, a matter of years, it will take another three years to make the runner plants available in quantity to commercial growers.

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ZOOLOGY

Tropical Jumping Spiders Jump to Attract Mate

➤ WHAT makes jumping spiders jump? The answer, in two carefully chosen words, is, That depends.

It depends for one thing on which way the wind is blowing, and for another thing, on how far along the evolutionary scale the particular species has come.

Jumping spiders, like certain other insects, birds, and other animals, go through characteristic gyrations, dances, and sundry other forms of showing off, presumably to attract a mate. Dr. Jocelyn Crane of the Tropical Research Department, New York Zoological Society, has come up with some new conclusions after studying the near tropical jumping spiders of Venezuela.

Although the sight of another spider usually sets off the courtship dance, Dr. Crane finds that chemicals borne by the air will also precipitate a spider jig. The more primitive the species, the more important the chemical stimulus.

Frequently a male spider will start showing off as soon as he spies another spider, male or female. When two males discover that they have been wasting their fanciest footwork on a rival, they promptly cut out the nonsense and rush at each other in mortal combat. This is true of relatively backward types, the more advanced species of jumping spider have worked out a code of etiquette for this situation, involving a ceremonial inter-male display.

Dr. Crane's paper on courtship and threat displays among jumping spiders was awarded honorable mention in the A. Cressy Morrison Prize Competition for 1949, announced at the annual meeting of the New York Academy of Sciences. The prize-winners of \$200 each were Abraham Slavin for "Stability Studies of Structural Frames", and Harold R. Hagan for "Embryology of the Viviparous Insects".

Science News Letter, December 24, 1949

Water emulsion paints are growing in popularity for home use; they are modest in cost, easy to apply, dry quickly and are free of objectionable odors.

GENERAL SCIENCE

Fellowship Controversy

► **CONTROVERSY** over FBI clearance has caused the virtual abandonment of any new fellowship program of the Atomic Energy Commission so far as it applies to non-secret research and study by those who have not obtained graduate degrees

The National Academy of Sciences and its National Research Council refused to administer the non-secret fellowship program since Congress voted last summer to require that applicants be investigated by the FBI and pronounced loyal to the AEC.

A predoctoral program will be carried out only for non-secret work by present fellows who want their fellowships renewed, but in these cases the FBI clearance will be obtained before renewal. The National Research Council will pass only on the scientific attainments of the students and leave the loyalty matters to the AEC.

One of the hottest controversies in the history of the National Academy resulted from the proposed FBI clearances, which

were discussed at the Rochester, N. Y., meeting in October.

There was no difference of opinion as to desirability of FBI and security clearance for those whose advanced training will take them into secret fields. The National Research Council will administer a program of such fellowships for those who have the Ph.D. and full loyalty procedures have been agreed upon.

Next year's program will include about 250 awards, 175 of them renewals, while there are now 421 AEC fellows.

The Academy, top science body of the United States, urged the AEC to attempt to get Congress to eliminate the FBI checks from future legislation. The AEC was advised to see that prospective fellows are told the nature of FBI investigations and the criteria by which decisions are made by the AEC.

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of sorghum by puffing it with steam, something like puffed rice

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AERONAUTICS

1949 Airlines Death Rate Is Lowest in History

► **AMERICA** has had the lowest fatality rate in history of domestic and international flying by the scheduled carriers, the New Orleans Association of Commerce was told by D. W. Rentzel, U. S. Administrator of Civil Aeronautics, in New Orleans, La.

The trend in aviation during the year has been upward in every respect for air carriers, he said, but spotty for personal flying. Light-plane output is not keeping up with the number of old planes being scrapped. Private aircraft ownership is highest in sparsely populated states, which have a high proportion of airports to population and a high percentage of good flying weather.

A new undertaking of the CAA, he reported, is assistance in the development of fast roads to airports from the cities they serve. It is advisory assistance to local officials. Too often, he stated, the time-saving of air travel is cancelled by the delays in getting to and from airports.

Science News Letter, December 24, 1949

MEDICINE

A-Bomb Causes Blindness

► **IF** another atom bomb ever drops, some of the survivors will go blind a year or two afterwards. The number likely to be blinded by the bomb may be one out of every 40 or 50 of those within a thousand yards of the bomb burst.

This may be predicted from a report by Drs. David G. Cogan, S. Forrest Martin and Samuel J. Kimura of Harvard Medical School, Boston, and the University of California Medical School, San Francisco, to the journal, *SCIENCE* (Dec. 16), in Washington, D. C.

These scientists are surveying atom bomb eye damage in Japan for the U. S. Atomic Bomb Casualty Commission. The survey was prompted in part by the discovery a year ago of cataracts in cyclotron workers in the United States.

The atom bomb blindness seen so far in 10 Japanese survivors is due to cataracts. Whether these were caused by neutrons or by gamma rays from the bomb is not known.

Among the 11 atom-smashing cyclotron workers whose eyes were damaged, neutrons seem the most likely cause of the damage, though this is not yet proved. Of 10 of the 11 cyclotron workers with eye damage, studied at the Wilmer Ophthalmological Institute of Johns Hopkins Hospital, Baltimore, three men have a severe handicap. Four are afflicted to a degree which does not at present interfere markedly with daily life. The other three have a minimal affliction which does not cause appreciable handicap.

The outlook is good for successful removal of the cataracts, with restoration of eyesight, in the severe cases. In two, this has already been accomplished, Drs. P. H. Abelson and P. G. Kruger of the Carnegie Institution of Washington and the University of Illinois state in their report in the same issue of *SCIENCE* on the cyclotron cataracts.

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AGRICULTURE

Silent Pop Sorghum May Soon Rival Popcorn

► **POPCORN** may soon have a rival pop sorghum which can be chewed noiselessly, without getting caught in the teeth, is vying to become the number one movie confection.

Although sorghum grains make a smaller puff than popcorn, their thinner hull leaves no husk to lodge between the teeth. Pop sorghum is more tender in consequence and when chewed produces no crackling sounds to detract from the sound track.

Such at least are the claims made for pop sorghum by plant breeders of the Texas Agriculture Experiment Station who have developed what they think may some day rival popcorn for the public's favor.

The idea of popping sorghum is not new. At least 50 years ago farm boys were taking the grains of sorghum, raised extensively for cattle fodder, and roasting them over open fires. The Chinese make a confection

GENERAL SCIENCE

Prescription for Stable World Is Given

► **FOUR** things are needed to make a "stable scientific society," in other words, a world free from war, famine and other disasters, Bertrand Russell, English philosopher, declared at the meeting of the Royal Society of Medicine in London.

But in his view the prospects are gloomy for a world governed by science being stable.

The four requirements, he said, are 1. One single world government with arms monopoly for enforcing peace. 2. General diffusion of prosperity. 3. Low birth rate everywhere to stop the present disastrous population increase. 4. Provisions for individual initiative and expression.

The unlikelihood of achieving these four requirements in the near future means we face the prospect of war, famine and pestilence, he declared. But he believes that ultimately world government may achieve these aims.

Russia, China and India are today, he said, the great reservoirs of procreation and poverty.

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Considerable damage has been done to turf within a radius of 20 miles of New York City during the past two years by the *Japanese beetle* and the *Oriental beetle*, with the latter the chief offender.

MEDICINE

Anti-Histaminics Upset

One out of five persons taking anti-histaminic cold treatment will suffer unpleasant reactions. Rest in bed during the beginning of a cold is still recommended treatment.

► ABOUT one out of every five persons taking anti-histaminic pills for the common cold will be upset by them, Dr Perrin Long, professor of preventive medicine at Johns Hopkins University School of Medicine, declared in Washington, D C

Dr Long spoke as guest of Watson Davis, director of Science Service, on Adventures in Science, radio program presented under the auspices of Science Service over the Columbia Broadcasting System

Disturbances in appetite, lessened ability to perform their job, sleepiness, and palpitation of the heart are among the symptoms that come from anti-histaminics, in the experience of doctors who have prescribed them for hay fever and other allergies

"While these symptoms are not hazardous," Dr Long said, "in about five per cent of people who take anti-histaminic drugs they may be so intensive as to make them really serious because sleepiness, grogginess, lack of alertness, diminished power of concentration, and poor muscular coordination may result in ordinary accidents, accidents while operating machinery, and accidents while crossing the street

"One can imagine the importance of the hazards which may be created by the use of these drugs if one visualizes several million people with diminished alertness and mental foggy driving on the streets and highways and operating machinery"

Under certain conditions anti-histaminic drugs will dry up the nasal discharge both in common colds and hay fever, Dr Long explained However, the ability of the drugs to stop nasal discharge is of relatively short duration and the drugs are "only pallia-

tive and not curative in their action," he stated

The common cold attacks people at all stages of their lives However, it is least common in babies under one year because of the baby's protected existence From the first to the sixth year colds are most prevalent Then comes a period of gradual decrease in number of colds, but at the beginning of the teen age there is another period of increased susceptibility This lasts until the age of 25 After that, in the population at large, there is a gradual decrease in colds throughout the rest of the lifetime

Asked what to do about colds, Dr Long said "Frankly, we can say, very little, except to stay at home in bed during the first 24 to 36 hours of the infection If, after doing this, the cold does not improve, if headache occurs, if the voice is lost, if severe cough ensues, or if fever and the general feeling of illness persists, call your doctor and ask him to come and see you Most colds are self-limited but a number of them hang on and produce secondary complications such as sinusitis, infection of middle ear, laryngitis, tracheitis, and even bronchitis and pneumonia It is because of these complications that an individual with a cold should take care of himself in order to avoid them, and, if he is so unfortunate as to develop one of them, he should see his physician immediately"

And, he said, there is "not one iota of scientific evidence to back up the popular beliefs that sitting in drafts, getting one's feet wet, over-exerting, losing sleep and other factors supposed to lower resistance will predispose to colds"

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multiple curves of the lens, it was considered impossible to mass produce them, according to Dr Tillyer

The new process consists of making a special mold having wave-like curves that produce the desired shape in the finished lens A ground and polished sheet of optical glass is placed on the mold and both are heated One side of the lens then has the required Schmidt curves, and the other can be reground and polished as desired

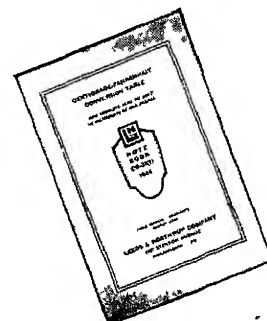
Secret of the mold lies in the materials of which it is made—kyanite and ball clay The former has a tendency to expand, while the latter tends to contract.

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The first mechanical clock, invented about 990 A D, had no hands but told the time by striking the hour or ringing a small bell.

Lead pencils originated in England soon after the discovery of graphite about 1560, the first pencils were made of graphite sawed into strips and inserted in lengthwise grooves in strips of wood

The addition of chemicals called *wetting agents* to water makes water more effective in fire-fighting, the treated water spreads more easily and penetrates the burning materials more deeply



Quick-Reading

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PHYSICS

Lenses Are Mass-Produced

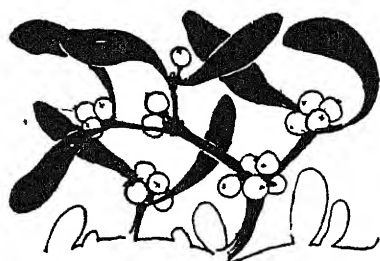
► MILITARY devices with uses not yet revealed by the government were possible during the war because of a secret method of producing Schmidt corrector plates disclosed in Southbridge, Mass A Schmidt corrector plate provides a lens ten times faster than a high-speed camera lens

Schmidt-type lenses today are used in the "Big Schmidt" camera on Mt Palomar and in Schmidt cameras for mass public tests in the campaigns against tuberculosis as well as in secret military instruments

Dr E. D. Tillyer, inventor of the process

for which a patent has just been granted and research director of the American Optical Company here, discovered after the war that he had won a race with German scientists They had been working night and day to perfect a method of mass-producing the lenses

Prior to the war there were less than 50 lenses of the Schmidt correcting type in the world and these were used in high-speed astronomical photography, Dr Tillyer states These required weeks and sometimes months to make, and because of the mul-



Mistletoe

➤ MISTLETOE, which all over the country is making boys bold and girls blush, has many reputations. None are as romantic as the one we briefly bestow on it at the Yuletide season

For one thing, during the workaday months of the year mistletoe is thought of, if at all, preeminently as a plant pest. It is a plant that grows on trees as a parasite. In Australia mistletoe has reached the status of a major pest. Its principal victim there is the eucalyptus tree, on which it has worked such damage that the weed killer 2,4-D is being used in a full scale campaign against it.

Mistletoe is native to both the Old World and the New, the two being different forms of the same family. Many legends and

charms were associated with the mistletoe in Europe. According to one belief, the mistletoe was once a full grown tree that grew like any proper tree on its own roots sunk firmly in the soil. Then, the legend has it, its timber was cut for the cross on which Christ was crucified. Since then it has dwindled to its present low estate, a dwarf and a parasite living off other trees.

The belief is still held in some of the more superstitious parts of Germany that mistletoe will make ghosts appear and if you talk to them they will answer you.

Among the ancient Druids, says Charles M. Skinner, mistletoe was a symbol of spirit, since it grew in the air on the sacred oak. At the year's end, a Druid priest in a white robe would cut the mistletoe with a golden sickle. A white cloth spread on the ground made certain that the twig did not touch earth.

The people would make charm bracelets and rings of the plant. Worn on the person or fastened over doorways, it was believed to have power to ward off evil.

The seeds of this parasitic plant, which has meant so many different things to different men and different ages, are given a wide range by the birds that feed on the berries. The seeds are sticky and they adhere to the bill of the feeding bird. Later the bird will clean his bill by rubbing it against the bark of a tree.

The seed sticks to the bark. Eventually it puts out a tap root which penetrates the bark and draws on the food circulating in the tree's sap.

Mistletoe has many facets. Cupid's ally, plant pest, magic charm, wood of the cross. It is also the official state flower of Oklahoma!

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ENTOMOLOGY

U. S. and Canada Blitz Common Foe: Mosquitoes

➤ A COMBINED airborne operation against an airborne foe has just been carried out jointly by defense agencies of Canada and the United States as scientists of the two countries leveled their deadliest insecticides against the arctic mosquito.

Airplanes operating in the Hudson Bay area sprayed wide swaths of enemy breeding territory, killing off the pestiferous little insects by the millions. The joint operation, organized to test the effectiveness of various insecticides in making the north country habitable for troops in the field, proved that DDT and parathion do an effective job in killing off the larvae.

Although DDT was used principally, parathion proved highly effective at even lighter dosages. Parathion, the U. S. Bureau of Entomology and Plant Quarantine explains, is so deadly a poison that it has not been recommended for general use by the public.

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On This Week's Cover

➤ NOVA Persei, a star that exploded in 1901 and out from which a gaseous shell has been growing ever since, is one of the objects recently photographed with the 200-inch Hale telescope at the Palomar Observatory. This photograph was taken as new tests of the giant instrument began, following a summer of repolishing portions of the surface of the mirror. Pictures such as this, taken to determine the 200-inch's resolving power, show that the perfection for which the astronomers were aiming has been achieved.

Nova Persei was only a very faint star of about 12th magnitude in 1901. Suddenly it exploded. Within 28 hours it became a moderately bright star of the third magnitude and could be seen with the naked eye. Within a year it had faded until it was only one-thousandth as bright as when it exploded. It continued to fade for about 20 years. Today its light varies between the 12th and 14th magnitude again and it can be seen only with powerful telescopes.

The nebula which now surrounds it became visible with telescopes six months after the outburst. This gaseous envelope has continued to increase steadily in diameter and at almost a uniform rate. Spectroscopic observations of the speed of the outward movement of the gas, combined with measurements of the expansion from many photographs like this, taken since it blew up, reveal its distance from the earth to be about 2,000 light years (one light year equals six million million miles).

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ASTRONOMY

Telescope Mirrors Heavens

➤ THE world's largest telescope, the 200-inch Hale telescope on Mt. Palomar, after having its face polished, is back at work mirroring distant universes with satisfactory accuracy.

Dr. Ira S. Bowen, director of Mt. Wilson and Palomar Observatories, when he received this year's Rumford Premium from the American Academy of Arts and Sciences at Boston described the first test observations.

One is a photograph of a star that exploded in 1901 and became so brilliant that it could be seen with the naked eye. Nova Persei has now faded to near its original faintness, visible in only the largest telescopes. The new Palomar photograph shows its gaseous shell in clear detail, although it takes light 2,000 years to reach the earth from this star.

A search of the heavens can now begin with the new giant telescope, Dr. Bowen indicates. Direct photographs will obtain

more information on the number of nebulae, like our Milky Way, and their distribution in space.

Spectrographic work will begin in March and will clock the velocities of the huge island universes moving out in space millions of light years from the earth.

Auxiliary equipment will be added to the Hale telescope in coming months. One supplementary lens will give the 200-inch telescope the same focal length as the 100-inch on Mt. Wilson and allow direct comparisons between photographs taken with both instruments. A Coude spectrograph will also be completed later.

In addition to polishing high spots around the outside edge of the mirror, a system of fans around the mirror and insulation prevent temperature changes from interfering with the definition of the mirror.

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Books of the Week

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BASIC THEORIES OF PHYSICS Mechanics and and Electrodynamics—Peter Gabriel Bergmann—*Prentice-Hall*, 280 p, illus, \$5 00 An introduction to the theories of mechanics and electrodynamics on an advanced level. A basic text for introductory theoretical physics

THE BORUCA OF COSTA RICA, Vol XXVI, No 2 —Doris Z Stone—*Peabody Museum of American Archaeology and Ethnology*, 50 p, illus, paper, \$2 50 An introductory report on the present-day Boruca Indians of southeastern Costa Rica.

BRAZIL WORLD FRONTIER—Benjamin H Hunnicutt—*Van Nostrand*, 387 p, illus, \$6 00, A report on the present and future potentials. A social, political, and economic survey

CANCER, What to Know, What to do about it —illus, paper, five cents, **CANCER OF THE BREAST**—20 p, illus, paper, ten cents, **CANCER OF THE FEMALE REPRODUCTIVE ORGANS**—20 p, illus, paper, ten cents, **CANCER OF THE DIGESTIVE TRACT**—24 p, illus, paper, ten cents, **CANCER OF THE MOUTH AND RESPIRATORY TRACT**—20 p, illus, paper, ten cents—*National Cancer Institute—Gov't Printing Office* Written in non-technical language, these pamphlets are intended to inform the laymen of the warning signs and symptoms, how to recognize them, and how to receive prompt medical attention

EFFECT OF PERMANENT FLOODING IN A RIVER-BOTTOM TIMBER AREA—Lee E Yeager—*Illinois Natural History Survey*, 65 p, illus, paper, free upon request to publisher, Urbana, Ill Report on the Pere Marquette Wildlife Experimental Area

ESSENTIALS OF ADOPTION LAW AND PROCEDURE—Federal Security Agency—*Gov't Printing Office*, 27 p, paper, 15 cents A guide to help modernize State adoption laws to protect the best interests of adopted children

FRANCISCAN AWATOWI The Excavation and Conjectural Reconstruction of a 17th-Century Spanish Mission Establishment at a Hopi Indian Town in Northeastern Arizona, Vol XXXVI—Ross G Montgomery, Watson Smith, and John Ous Brew—*Peabody Museum of American Archaeology and Ethnology*, 361 p, illus, paper, \$5 85 (Cloth \$8 35)

GEOLOGY OF THE COAST RANGES IMMEDIATELY NORTH OF THE SAN FRANCISCO BAY REGION, CALIFORNIA—Charles E Weaver—*Geological Society of America*, Memoir 35, 242 p, illus \$6 50

HANDLING RADIOACTIVE WASTES IN THE ATOMIC ENERGY PROGRAM—*United States Atomic Energy Commission*, 30 p, paper, 15 cents A non-technical report describing radioactivity and its biological effects

IRON BLAST-FURNACE SLAG PRODUCTION, PROCESSING, PROPERTIES, AND USES—G W Josephson, F Sillers, Jr, and D G Runner—*Gov't Printing Office*, 304 p, illus, paper, 75 cents A report of the National Slag Association based on data gathered by the Problem Committee of the Association

MENTAL HEALTH IS A FAMILY AFFAIR—Dallas Pratt and Jack Neher—*Public Affairs Committee*, 31 p, illus, paper, 20 cents Presents some of the causes of personality problems

in families and suggests some preventive methods

NEVER TOO OLD—*New York State Joint Legislative Committee on Problems of the Aging*, 216 p, illus, paper, free upon request to the publisher, 94 Broadway, Newburgh, N Y Intended to help pave the way for better understanding of the needs and capabilities of our oldsters

NEW YORK UNIVERSITY—BELLEVUE MEDICAL CENTER Annual Report 1948-1949—*New York University-Bellevue Medical Center*, 64 p, illus, paper, free upon request to publisher, 477 First Avenue, New York 16, N Y A report of the important developments of the medical center's first full year of operation

1949 FACTS ABOUT NURSING—*American Nurses' Association*—12th ed, 94 p, illus, paper, 50 cents Latest available basic data

PREDICTING SUCCESS IN PROFESSIONAL SCHOOLS—Dewey B Stuit and others—*American Council on Education*, 187 p, \$3 00 A report on the effectiveness of educational and vocational counseling.

THE QUESTION OF ESTABLISHING UNITED NATIONS RESEARCH LABORATORIES—Department of Social Affairs—*United Nations*, 290 p, paper, \$2 00 Leading authorities discuss the pros and cons of establishing international research laboratories

RESEARCH IN REVIEW Sixth Report, 1949—*Sugar Research Foundation*, 45 p, paper, free upon request to publisher, 52 Wall Street, New York 5, N Y Trends and achievements in sugar research

SAFE HANDLING OF RADIOACTIVE ISOTOPES—National Bureau of Standards—*Gov't Printing Office*, 30 p, illus, paper, 15 cents A handbook giving general recommendations suitable for typical laboratory or small industrial operations

SELENIUM—Sam F Trelease and Orville A Braith (Publisher's address Sam F Trelease, Box 42, Schenckhorn Hall, Columbia University New York 27, N Y), 292 p, illus, \$5 50 Its geological occurrence and its biological effects in relation to botany, chemistry, and agriculture, nutrition and medicine. The first literature citation is to an article by Science Service on "A disease supposed to be due to grain"

Science News Letter, December 24, 1949

INDUSTRY

Cheaper Paper from Wheat Straw Is Promised

➤ A NEW grain belt industry, paper from wheat straw, may result from cheap water transportation resulting from current river development schemes, W J Promersberger, professor of agricultural engineering at North Dakota Agricultural College in Fargo, N D, predicts

Wheat straw is known to make good packaging paper, box board and building board. Transportation costs have been too high for profitable commercial manufacture. Shipping over 100 miles makes the

price of the finished product prohibitive

This obstacle will be overcome, Prof. Promersberger believes, when large bodies of dammed water become available close to the wheat fields

"It is not outside the realm of possibility that the Missouri-Souris development will overcome this shortage," he said. "Perhaps some day we shall see near Garrison, N D dam, or near some other dam, a paper board factory lying in the midst of a wide area of cheap straw, with both cheap water and cheap fuel—lignite—right at hand"

Science News Letter, December 24, 1949

High-frequency radio signals in an atmosphere of certain gases are used in a new process to obtain temperatures high enough to melt tungsten, the melting point of which is about 3370 degrees Centigrade

RADIO

Saturday, December 31, 3 15 p m, EST

"Adventures in Science" with Watson Davis, director of Science Service over Columbia Broadcasting System

Mr Davis will broadcast a "Report from American Association for Advancement of Science" from the annual meeting in New York at which time he will bring to the microphone scientists who have made the most interesting and important announcements during the week

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• Top Patents of The Year •

If you want the patent number of the inventions described here send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., N. W., Washington, 6, D. C. and ask for Patent Bureau Bulletin 1849

Notable and interesting inventions patented during the year include:

A bonding process for putting a protective coating of aluminum on steel by use of a fine iron coating on the steel deposited electrolytically as a bonding agent

A method of navigation and orientation by picking up very short radio waves emitted by the sun and other stars which can be received in any weather

Improved chemical process for extracting industrially useful sugars from wood.

Synthesis gas made by partial combustion of coal or lignite in underground seams and piped to the surface for use

Wool made non-shrinking by exposing it to sonic vibrations intense enough to cook an egg, thus coagulating the wool proteins

A way to freeze eggs without breaking the shells by removal of a little of the moisture inside the shell, this preserves the eggs for later table use in fresh egg condition

A radio device which will be ejected from an airplane about to crash and will automatically and periodically broadcast distress signals

An improved process for producing phosphate fertilizer by charging a vertical smelting furnace with mixture of phosphate and silica and absorbing the fluorine with water vapor produced during combustion of the fuel

A process for concentrating uranium out of its ores by heating the lower oxide of uranium in the presence of oxygen under pressure

An air-conditioning system for mines which cools and dries the air and returns it as near as possible to the working face

A process for preparing vitamin K in forms that will keep longer without deterioration

Use of flame instead of steel blades for thinning out cotton plants by machine

A low-temperature process for totally converting coal into oil under moderate pressure

Use of short-length radio waves focussed by mirror-back oscillators to make the basis of nitrate fertilizers and other chemicals out of air and other gas mixtures

A high-pressure, high-temperature turbine run by hot air instead of combustion and thus not so much subject to corrosion.

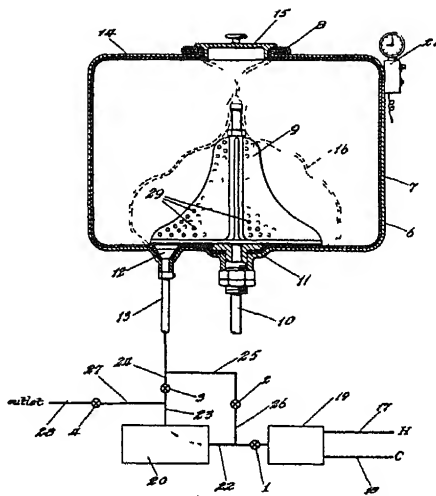
Device for making it possible to telephone by means of a pair of flashlights, incorporating in one ordinary powerful flashlight a telephone transmitter with circuit hookup to cause the lamp current to fluctuate in tune with the spoken message, and in the other a lens, for focussing, amplifying hookup and telephone receiver

Design for jet-propelled airplane which would have propellant gases streak in a solid sheet from the trailing edges of their wings

Design for a steam turbine in which steam jets from a central disk-shaped stator are delivered into a ring-shaped body of water whirled around in a rotating casing

A machine for harvesting vegetables such as celery, broccoli and cauliflower, making use of an inverted u-shaped frame, side-mounted on a tractor, with two rotating cutting bands, one just under root level, the other to sheer off excess tops.

Production of nickel, either pure or in ferromnickel form, from low-grade ores by a process for separating out the magnesia.



A washing machine that uses air pressure to squeeze the water out of the clothes while still in the washer.

Method for sending radio-frequency energy along pipes such as city water pipes or gas pipes or along railroad rails

Revival of Langley's aerodynamic idea in the design of a flying boat having two pairs of wings mounted in tandem with multiple engines mounted on the leading edge of the trailing pair

Control apparatus for a coin-operated type-

writer in public places, which limits the use of the typewriter to a certain period of time after coin is inserted

A method for producing a concentrated olive essence from olive pits which can be used to convert less esteemed food oils into imitation olive oil

A tea concentrate made by steeping the leaves at boiling-water temperature and condensing the aromatic steam distillate

Method for discharging static charges on vehicles on the highway by means of a flexible upright-projecting metal rod that makes contact with passing cars.

A jet-propulsion unit for use in water instead of air and using fuel that is "burned" by reaction with water

Prompting of television actors by directed, short-range, short-wave radio

Method for separating fresh corn from cob without injury by bursting the cob into fragments, each carrying a separate grain

Explosive bursts releasing clouds of bright varicolored smoke for use in daytime fireworks or for determining accuracy of artillery fire

A machine for automatically heating pre-packaged hot-dogs

A hybrid aircraft with ordinary airplane wings and two larger-than-ordinary pusher propellers, variable in both pitch and speed, which can be swung through 90-degree arcs to push vertically, helicopter-wise, for take-off, landing, and hovering, or to push horizontally when the plane is in flight

Method for making insecticide sprays stick to plants by giving each particle an electrostatic charge induced by ejecting the spray at velocity greater than that of sound

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THE WEEKLY SUMMARY OF CURRENT SCIENCE

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See Page 422

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GENERAL SCIENCE

Next Year in Science

Factory duplication of the method of photosynthesis and the solution of the structure of the atom's heart are major mysteries which may be top science advances of 1950.

By WATSON DAVIS

➤ TWO major mysteries of nature may be solved in 1950, bringing new energy to the world compatible with the great spurt of atomic progress that followed the fission of uranium in 1939.

Scientists hope to discover the way in which the green leaf captures the energy of the sunshine and turns it into sugar and starch that feeds and fuels the world. If the method of photosynthesis is discovered and if it is duplicated practically for factory use, it will be a great advance. This may happen within the year. Intensive efforts are being made.

Atom's Heart Probed

How the heart of the atom is put together and what holds it together is still unknown. Because discovery of the nature of these "meson forces" is so important, cosmic rays are being studied extensively. Theoretical physics is receiving more attention than ever before. If new concepts are obtained and applied experimentally, it may lead to new kinds of atomic bombs and useful energy from materials more plentiful than uranium. Is this on the 1950 calendar?

These are long shots for 1950. Here are more sure predictions.

Following the reported 1949 successes of the steroid compounds, cortisone and ACTH, in treating rheumatic arthritis and other similar diseases, there will be great effort made to find other similar materials. Increased production of these scarce hormones will be obtained through use of more plentiful raw materials.

There is a possibility that adrenal glands from animals may be kept alive outside the body. Treated with precursor substances that can produce the adrenal cortex hormones, they may be made to produce the active steroid hormones useful in treatment.

Exploration of the effect of these hormones will probably show that they are connected not alone with arthritis and possibly cancer, but with mental disorders. It probably will be found that if a sufferer from schizophrenia responds to adrenal hormone treatment, there are possibilities of good effects from electroshock.

Mental Disease Prevention

Increasing attention will be given to the treatment and prevention of mental disease, with an accent upon the training of psychiatrists and equipping of general prac-

titioners and hospital attendants with knowledge of psychiatry.

New antibiotics, some of them effective against diseases not yet reached by this class of disease fighters, will be found. New discoveries in biological substances in plants and animals will probably be made, some of them of use in disease treatment. In the case of viruses, it is expected that it will be possible to produce permanent changes in them so that these mutations of these substances can be used for eventual treatment of disease.

To man's control of nature on farm and in field, chemicals will give continued aid. The usefulness and limitation of such substances in insect control as DDT and 2,4-D in weed killing will be worked out further. New varieties of plants and animals, produced genetically and by breeding, will be introduced. Look for better range grasses for use in the semi-arid southwestern United States.

Early African Man

The long history of man's evolution on earth is being discovered with accelerating pace. From Africa there are due during the coming year new finds of ancient human forms. These are likely to approach more closely than any others the "missing link" that was talked about in Darwin's day.

The exact dating of ancient human remains has been difficult in the past. Investigations of radioactive materials, stimulated by atomic energy researches, promise to make the accurate determination of the age of such skeletons simple and more definite. To the dating of all geological material through the eons of the age of the earth, radioactivity will give more precision in the months to come.

The conquest of space will continue with great urgency because the world is preparing for war in the stratosphere. Rockets, jet planes and guided missiles of every possible sort will make trial flights, but most of them will be secret so far as public announcement is concerned.

Artificial Moon

Man's power may succeed in flinging into outer space an object outside the practical gravitational influence of the earth. The first of the earth's artificial moons, or satellites, may be placed in an orbit, a forerunner to such machines that can be used for science and even possibly for war. This is an extreme possibility for 1950,

but some government may be at work on it with great secrecy.

For more conventional aircraft, most of the progress will be improved performance of planes now in existence and continued research and progress in aeronautical design so necessary to keep up with the rest of the world.

Giant electronic "brains" will begin to figure more in research for 1950 as they get into more extensive use. These electronic computers will be used for complex mathematical handling of information that would be hopelessly obsolete if subjected to ordinary methods of computing. For instance, special electronic computers are likely to begin to receive radar information about an incoming plane or rocket and use it in such a way as to determine and set automatically the path of a guided missile that will intercept it.

Atom Smashers

The other kind of complex machines, atom smashers of various sizes and uses, will be hard at work in 1950. Will there be found through them use the negative proton for which physics has a place due to our human belief in the balance of nature (since there is a positive electron)? Or will there be found new kinds of mesons? These are powerful but brief-lived particles that are part of the nuclei of atoms. There is still a great frontier within the atom. Perhaps the neutrino, another elusive particle required by theory, will be found, too.

There is prospect of eventual discovery of chemical elements beyond number 96, now the heaviest known. The new elements will all be artificial, highly radioactive and short-lived and the chemists may not get around to discovering and isolating them in 1950.

Star Evolution

How the stars have evolved will be better understood as the result of work at Lick Observatory in California that will be made known during the year. Relationships between the color and the candlepower of stars will be developed that will modify astronomical theories. A new telescope will go into service at Harvard's South African station that will enrich the photographs of the southern skies.

The 1950 census will give new information about the human population of not only the United States, but the whole western hemisphere because most of the other parts of the two continents will be joining in this decennial nose-counting.

Science News Letter, December 31, 1949

GENETICS

Sex Organs Rejuvenate

Worn-out ovaries are rejuvenated when transplanted to young dogs. It is thought that this rejuvenation will also occur in transplantation of human ovaries.

► THE possibility that a woman could give birth to her grandmother's children was raised when a bewildered little mongrel gave birth this year to two sets of thoroughbred cocker spaniel puppies.

The cocker spaniel puppies were born after veterinarian Dr. Leon F. Whitney of Orange, Conn., had transplanted one ovary, the female sex gland, from a female cocker spaniel to Brownie and then bred the mongrel to a male cocker.

Brownie's strange motherhood was the culmination of a series of transplantations with other dogs in which Dr. Whitney discovered for the first time that worn-out ovaries from old dogs became rejuvenated when transplanted to young dogs.

Dr. Whitney worked with Dr. Harry S. N. Greene, professor of pathology at Yale University School of Medicine, New Haven, Conn. Dr. Greene declared that he saw no reason why ovaries could not be transplanted between human females. He added that, although it hasn't been tried yet, there is no reason why an old human ovary would not become rejuvenated when transplanted into a young woman.

Dr. Whitney's experiments have not yet gone on long enough to permit him to perform a second transplantation of the cocker's ovary now inside Brownie. However, he plans to make another transplantation when Brownie gets old. "If that succeeds," he says, "it will open up a whole new field of animal genetics."

Dr. Greene confirmed Dr. Whitney's work as completely valid and declared that it represented "a revolution."

Both were thinking of the possibilities in the cattle and livestock industries. Scientists have shown that fertilized eggs can be transplanted from one cow to another, opening the way for pedigreed, pure-blooded calves to be born of scrub-foster mothers. But if the ovaries of cows can be transplanted, and if they are rejuvenated as those of Dr. Whitney's dogs have been, it would be possible for a champion pedigreed cow to have calves years after she herself is dead. Dr. Whitney says he'll try transplantation in cattle in 1950.

Neither Dr. Whitney nor Dr. Greene have thought much about the possibilities of the same operation applied to human females. But cancer of the ovary occurs in 12 out of every 100,000 women. And, when it is first discovered, in about 50% of the cases both ovaries are affected. The possibility exists that where both ovaries have to be removed, a woman might still be able to have children by having another woman's

ovaries transplanted into her. But, the children would be the other woman's.

The ovary transplanting operation on dogs is done by shifting the ovaries through a slit in the capsule that encloses each. At first Dr. Whitney used fine catgut to sew the cuts, but since this caused adhesions, he changed to silk sutures. He also found it necessary to perform the operation when the recipient dog was in heat. Many experiments in other parts of the sexual cycle failed.

Evidence of rejuvenation of the transplanted ovaries came this month from Dr. Greene who examined sections of them under the microscope. He reported that the ovaries, after they had been transplanted, showed "all the signs of a young gland with many follicles." Follicles are the little sacs in the ovary which contain the egg cells. An old dog's ovaries rarely show signs of these.

Brownie's two litters were composed of ten dogs each. Because she retained one of her own ovaries, five dogs of each litter

were mongrels. But the other five were pure cocker. Said Dr. Whitney, "There was no question of either their maternity or their paternity. Both were cocker."

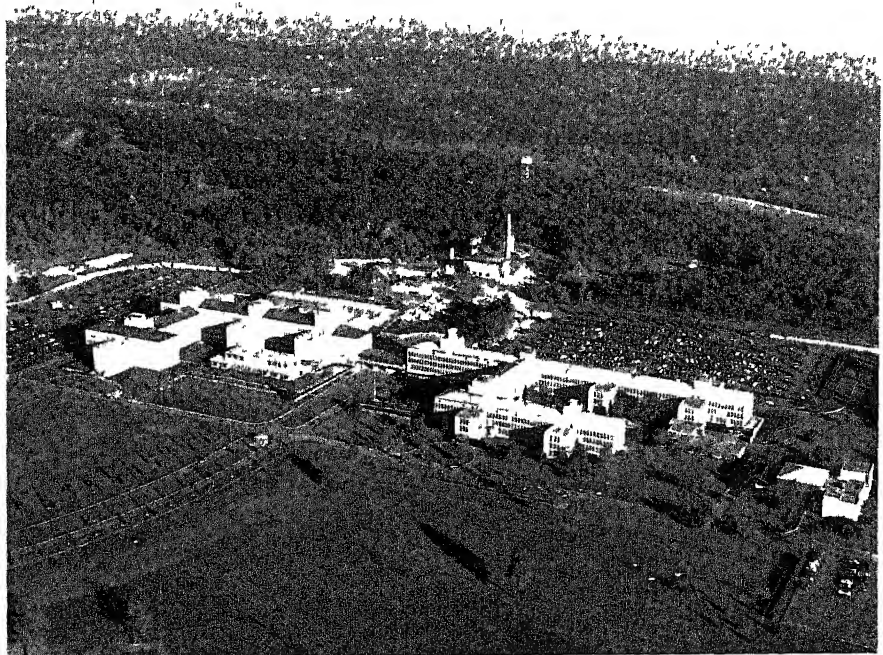
Brownie is not the only dog to have another dog's puppies. The first was a black-and-white Dalmatian named Imogene. Dr. Whitney replaced her ovaries with those of an 18-year-old cocker. At that age, the cocker was far beyond the time she could produce a litter.

Imogene came into heat on the cocker's timetable rather than her own. Then, because Dr. Whitney couldn't find a male cocker large enough, he bred the Dalmatian to an English setter. Two puppies were born. Neither was any relation to a Dalmatian.

Last month, Dr. Whitney received a letter from a veterinarian in Denmark, Anker Scheel Thomsen, reporting successful operations on setters, a German pointer and an airdale, an Alsatian wolfhound and a boxer, and a 12-year-old mongrel with a two-year-old fox-terrier. Said Dr. Thomsen, the Alsatian had two boxer puppies, "who are still alive and well."

Meanwhile Brownie's thoroughbred cocker spaniel puppies are not recognized by the American Kennel Club under present rules. Dr. Whitney plans to obtain a really famous dog, transfer her sexual glands to a dog of a different breed and then put the offspring up to dogdom's social register as a test case.

Science News Letter, December 31, 1949



TELEPHONE RESEARCH HOME—The latest contributions of science and technology are applied to Bell System communications in the above laboratories. The country location about 25 miles from New York was selected to escape the noise, dust and vibration and electrical interference encountered in a metropolitan center. The acoustics building, containing the famous "dead room" is at the extreme lower right.

PSYCHOLOGY

Body Learns Without Brain

Learning goes on in spinal cord, psychologists maintain. A kitten that walked, although its spinal cord was separated from its brain, is part of the evidence.

► SOME parts of the body can learn to do things without benefit of the brain, it appears from research reported by Dr. Phil S. Shurrager and R. A. Dykman of the Illinois Institute of Technology, Chicago, at the meetings of the American Association for the Advancement of Science.

The learning goes on in the spinal cord, these psychologists maintain. This is contrary to the "traditional" viewpoint of other psychologists, neurologists and physiologists that learning is restricted to the brain alone.

Moving pictures of a kitten that walked, although its spinal cord was separated from its brain at the age of four weeks, were shown as part of the evidence for learning ability in the spinal cord.

This kitten's spinal cord was cut at the level of the first lumbar vertebra, or a little below the middle of the back. The animal was kept in excellent physical condition and was exercised daily by massage and manual and electrical manipulation.

Thirteen weeks after the spinal cord had been cut, the kitten could stand and walk for 10 minutes at a time, crouch and jump as much as a foot, run for three or four feet and turn corners without support, depending upon balancing movements in the hind part of the body.

Step reflexes from the spinal cord are not enough to account for the walking the cat finally did, in Dr. Shurrager's opinion. He pointed out that the development of coordination did not follow a stereotyped pattern or proceed smoothly. Instead, there

were plateaus and then slips back to less good performance. Improvement was gradual and seemed to vary with the amount of training.

Conditioned reflex tests on cats immediately after the spinal cord was cut and some weeks later showed, Mr. Dykman reported, that the conditioning, or experimental learning, over a period of days resulted in gradual improvement in learning efficiency. Experimental forgetting, or extinction of the conditioned reflex, resulted in a gradual loss of the learning to the point of disappearance of the learned response.

"The spinal cord," Mr. Dykman declared, "can no longer be regarded as a reflex and communication center. It has the property of modifiability as shown by its capacity to learn independent of the rest of the spinal cord and brain."

"Learning is possible in all the gray matter of the brain and spinal cord."

Science News Letter, December 31, 1949

ORNITHOLOGY

The Huia's Go Pffft, End Up in Yale Museum

► MARITAL cooperation just didn't work out for Mr. and Mrs. Huia (pronounced who-ya). In fact their whole family has gone pffft, despite the fact that their way of life was one of the most beautiful examples of married partnership nature had to offer.

The Huia's once were rather common

birds who lived in New Zealand. Yale University's Peabody Museum has just acquired a pair of Huia's, in good condition except for the fact that they're stuffed and have been dead since before 1907, when the last live Huia was seen.

Mr. and Mrs. Huia had to get along well together in order to eat. He had a short, stout and straight beak, while hers was long, slender and curved. With his beak, he cut through the heavy bark of trees and then she probed underneath for palatable insects, for both of them.

Science News Letter, December 31, 1949

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PSYCHOLOGY

In what part of the body besides the brain is learning now thought to take place? p. 420

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ASTRONOMY

Dust Changes Starlight

Dust particles spinning like a football in space are the latest proposed theory to explain the polarization of light from stars, one of the newest astronomical puzzles.

➤ **ELONGATED** dust particles containing a small amount of iron and spinning like a football end-over-end in a magnetic field in space were proposed to the American Astronomical Society, Tucson, Ariz., to explain the polarization of light from the stars.

This new theory to solve one of the newest puzzles in astronomy was proposed by Dr. Jesse L. Greenstein, of Mount Wilson and Palomar Observatories, and Prof. Leverett Davis, Jr., of the California Institute of Technology.

In recent years astronomers have found that the light from certain stars is polarized partially. Some of the light rays are constricted to vibrate in certain planes instead of being free to vibrate in planes of random orientation. Evidence for this has been found chiefly by John S. Hall, now of the U. S. Naval Observatory, and W. Hiltner, of Yerkes and McDonald Observatories. Their observations have been interpreted as requiring a specific orientation of elongated particles of interstellar dust. Through clouds of matter containing dust and gas, all starlight must pass on its way to the earth from the distant parts of the Milky Way system of stars. These clouds of interstellar matter are not uniformly distributed, but distinctly patchy in their distribution.

The only mechanism for orienting particles of matter seems to be the action of a magnetic field in space on the iron content of the interstellar dust grains. Recently, to explain the origin of cosmic rays, Dr. Enrico Fermi of the University of Chicago proposed the presence of a magnetic field in space (intensity about 3×10^{-5} gauss). Dr. Fermi imagines this field to exist, with lines of force parallel over small regions, but randomly oriented from cloud to cloud. The astronomical observations of polarization favor the uniformity of the direction of the field over regions measuring 300 light years across or more.

Chief difficulty with the magnetic field hypothesis has been the necessity to fill space with particles of dust composed mostly of iron and therefore more or less permanently magnetized (ferromagnetic) and relatively at rest so the magnetic field could act on them.

Dr. Greenstein had already shown that near bright stars the gases are at temperatures of as much as 10,000 degrees. Each dust or gas particle is constantly being bumped into by other particles, all moving around at high speeds. Such collisions would destroy any orientation produced by

a magnetic field and prevent the dust particles from doing any polarizing of starlight.

From a football game, the California scientist could have got their explanation as to how spinning particles could go on spinning and nevertheless "look" to light passing through them like oriented particles. If a football spins end over end as it goes through the air it looks like a circle as seen from the side. But it looks like the ellipse that is seen from the front or back. If it is spinning around its long axis, the way it is usually thrown, it looks like a circle from its front or back, but like an ellipse from the side. Dr. Greenstein believes that spinning interstellar dust particles can be lined up to spin like end-over-end footballs by a magnetic field of the intensity proposed by Dr. Fermi. Small amounts of iron in the dust particles are all that are needed to make them susceptible to the action of the magnetic field, that is, paramagnetic. They need not be mostly iron.

"Thus we picture these slightly paramagnetic dust grains as spinning rapidly around an axis which keeps being disoriented by collisions with hydrogen atoms, while the magnetic field patiently keeps trying to keep the axes oriented," Dr. Greenstein said. The shortest axis of a dust grain, regardless of its shape, will be the one around which it will tend to spin.

Statistically, because of the collisions, not all the particles will be properly oriented to produce polarization, but enough to produce the partial polarization actually observed can be explained by this theory. In the absence of his theory, Dr. Greenstein points out, a magnetic field 10 times as strong would be needed, the interstellar cloud would have to be at a temperature near absolute zero (10 degrees Absolute) and the particle would have to be ferromagnetic.

Science News Letter, December 31, 1949

OCEANOGRAPHY

Present Water Shortages Are Only Mild Beginning

➤ **THE** current water shortages, not only in New York but throughout the world, are only the beginning. In a few thousand million years or so there won't be any water left at all. Dr. Hans Pettersson, Swedish professor of oceanography, made that clear in a lecture to the Royal Institution of Great Britain.

Dr. Pettersson said that the earth is

suffering from progressive dessication, an ailment common to all aging planets. It is drinking all the water in the oceans, converting the water into components of its solid crust.

"It will then have reached the present tragic state of its neighbor Mars, with its oceans gone," said Dr. Pettersson, "and with them, inevitably also, its oceanographers."

Science News Letter, December 31, 1949

PHYSICS

Radioactivity Detector Has Probing Nose

➤ **LESS** danger to workers using radioactive products and byproducts from atomic energy developments is promised with a new radiation detector which has a four-foot probing nose. The new instrument was revealed by General Electric in Schenectady, N. Y.

The business end of the detector is an electronic tube at the tip of the probe. Attached to the tube is a phosphor, a material that gives off light in the presence of radioactivity. Light from the phosphor acts upon the electronic tube, and is converted into electrical energy. This activates a meter in the instrument itself.

A lightweight battery, carried in a special case by the operator, provides the electric power for the instrument.

Science News Letter, December 31, 1949



LONG RANGE DETECTION—A long-probe radiation detector, which permits the operator to measure radioactivity from a distance, is demonstrated by Charles Lemmond, engineer in the G-E General Engineering and Consulting Laboratory, Schenectady, New York.

PSYCHOLOGY

Men Are Weaker Sex

Men undergo more physical and emotional illnesses which lead to higher death rate. They also are faced with more dramatic crises indicative of aging.

➤ MEN are really the weaker sex. They have more severe emotional illnesses, more physical illnesses leading to death, a higher alcoholism, delinquency and suicide rate.

These are the findings of Dr. George Lawton, New York psychologist who has specialized in the problems of the middle years and old age. Speaking at Cooper Union, he pointed out that it is much more difficult for men to age successfully than women.

Dr. Lawton stated that men both in the realm of employment and sexual performance face more dramatic crises indicative of aging. The dividing line between the first and last half of life in men and women is very much sharper for the male. He presented a list of rules of "What Every Man Should Know," stressing that a man as he got older had to exchange speed and quantity for strategy, skill and quality.

Many a tired businessman is tired because he is overworking to escape from close emotional relationships with his wife and members of his family, Dr. Lawton believes.

A modern woman needs even more than her home, a husband and children in order to give her a complete sense of purpose and intellectual stimulation, Dr. Lawton pointed out. He said that every woman, regardless of her financial situation, needed a part-time job, community activities, and some creative outlet. He also stressed the point that women in the middle-income bracket tended to do less work than they should and their husbands do more work. In such a case a wife, in order to help her husband enjoy life more and perhaps even live longer, should help share her husband's work load and share his economic and mental burdens.

Dr. Lawton's recommendation was that both men and women undergo regular examinations, both medical and psychological. The psychological examination for middle-aged men and women would have the following objectives:

1. To show executives and professional men how to slow down, to switch from a strenuous life to a slower but still as interesting, nourishing one.

2. To show inter-relationship between job attitude and philosophy of life on one hand—and sexual difficulties (impotence, etc.) on the other. In women, the relationship between career and difficulty in establishing an emotionally satisfying relationship with men.

3. To save marriages. Seventy-five percent of marriages ending in divorce could be saved if both husbands and wives went

to psychologists not later than 10th or 15th anniversary. Fifty percent could be saved if one partner went. Lukewarm marriages could be improved.

4. Relationships with children would be far happier as the children grow older, happier for both child and parent.

5. To study aptitudes of men and women, see changes in vocational interests and abilities, suggest job changes for men. Women could build up life outside of husband and children. Might need a real job some day, whether for money or not.

6. Both men and women need psychological guidance for creative outlets, even if they pass muster as far as personal adjustments go.

Science News Letter, December 31, 1949

HOME ECONOMICS

Handi-Coat Is Attractive, Useful and Rain Repellent

➤ HANDI-COAT may soon become a familiar word to women who do the family shopping. It is the name given to a new, government-designed coat of light-weight,

water-repellent cotton shown by the U. S. Department of Agriculture in Washington, D. C.

As part of a program to make available useful clothing that gives protection against rain, snow and sun, the coat was designed by Clarice Scott of the department's Bureau of Human Nutrition and Economics. Manufacturers of ready-to-wear and patterns can get the design of the coat without charge.

Features of the coat include a slot for a shopping list and a sleeve dispenser for paper handkerchiefs, in the sleeve, a place for pen and pencil to stand upright in the pocket, a long zipper closing, a pleat that allows comfortable walking, and a plastic carryall that folds into a pocket when not in use. A plastic film that slips over the grocery bag in the carry-all for protection against rain can be folded into a little pocket on the outside of the carry-all when not in use.

Science News Letter, December 31, 1949

On This Week's Cover

➤ A .22 caliber bullet smashed through a glass jar, then broke an electrical conductor to take this picture. Breaking of the conductor set off a high-speed photoflash, which illuminated the action for two-millionths of a second.

Science News Letter, December 31, 1949



SCIENTIFIC SHOPPING—The handi-coat carry-all, made with plastic over stiff cardboard, is right size for the largest grocery bags. It can be carried to the store folded like a purse.

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ERRATA, Vol. 56, Nos. 1-27, July-December, 1949

PAGE	TITLE BEGINS	CORRECTION
3	Heavy Nuclei	Par 4, lines 10, 11, read also there, Dr Phyllis Freier, and Dr E J Lofgren
26	Poison Ivy	In subhead and par 6, line 1, delete new
30	America's Cherubim	Par 3, line 7, Exodus for Genesis
41	Atomic Scientist Attacks	Par 5, line 14, Northwestern University for president of Central Scientific Company, Chicago
59	Jupiter Now Prominent	Col 1, line 10, 17,500 for 37,000, line 11, 20,000 for 34,000, line 13, 6,000 for 16,000
68	Confirm Opposites	Par 4, line 2, introvert for extravert, line 3, read extravert-feeling-intuitive wife
72	Insects in Baltic Amber	Amber insects considered Oligocene, about 50 million years old
79	Range of Vision	Par 1, lines 2, 3, read patients who have hemianopsia and cannot
216	Tungsten Filament	Col 2, line 8, delete American
265	Bones of Birds	Line 4, insert after Los Angeles, Dr Hildegard Howard, Los Angeles Co Museum
318	Poinsettia Pointers	Col 3, delete last two sentences
387	Earth's Current	Subhead, line 2, current for charge

GENERAL SCIENCE

Ancients Taught Science As a Writing Exercise

► IN 300 B C in what is today Iraq the ancient Sumerians taught the sciences of botany, zoology, geography, mineralogy, mathematics, and linguistics. They instructed their youth in these sciences, not because they had technological application, but primarily to teach the difficult art of writing Sumerian script.

The land of Sumer, "was the seat of the predominant civilization in the ancient Near East," Dr Samuel Noah Kramer of the University of Pennsyl-

vania told the American Association for the Advancement of Science annual meeting.

In order to teach future scribes how to write, he said, the Sumerian "professors" compiled lists of words which students committed to memory, and then reproduced as copying exercises.

These lists were actually classified tables of facts pertaining to the different sciences. These very early classifications of specialized knowledge—actually a form of science textbooks—are "already beginning to prove of no little significance for the history of science," Dr Kramer said.

Science News Letter, December 31, 1949

ASTRONOMY

Brilliant Stars in South

Orion, the warrior, and many other stars crowd the southern part of the sky. The planets will appear later on January nights.

By JAMES STOKLEY

➤ AS one looks at our accompanying maps of the January evening skies, particularly that for the south, he gets a very definite impression of crowding. This is not from any fault of the draftsman, but from the fact that the stars happen to be arranged that way. For this part of the sky actually contains more brilliant stars than any similar area.

The maps show the skies as they appear around 10 o'clock on the evening of Jan. 1, an hour earlier at the middle of the month and two hours earlier at the end. Perhaps the best group to start with is that of Orion, the warrior, characterized by the three stars in a row forming his belt. Above the belt is Betelgeuse, whose name is marked, and Bellatrix (just under the I in Orion) which are supposed to indicate the shoulders. The two bright stars below the belt—Rigel, and Saiph, to the left—are in his legs.

The curved row of stars to the right of the name form an upraised club which he uses to defend himself from charging Taurus, the bull, next constellation to the right. Here we find the bright star Aldebaran, marking the animal's eye, and the V-shaped group called the Hyades which forms his face. To the right, in his shoulder, is the little cluster of fainter stars we call the Pleiades.

Two Dogs Are Visible

Following Orion are two dogs, Canis Major and Canis Minor. The greater dog is lower, and contains Sirius, the "dog-star," brightest of all the stars visible in the night sky. The lesser dog, above, is marked by another brilliant star, Procyon. Still higher, and toward the east, we come to Gemini, the twins, with Castor and Pollux, the latter of the first magnitude. And almost overhead is another of the first magnitude, Capella, in Auriga, the charioteer.

Just a little to the west of Auriga is the constellation of Perseus, the champion. Below Perseus, toward the west, is Andromeda, the princess he rescued in an old story of mythology. And below this group is Pegasus, the winged horse.

Saturn to Rise

This is not a very good month for planets, and none are marked on our maps. Venus, which has been so brilliant in the western twilight recently, can still be

glimped low in the west after sunset at the beginning of January, though later it will disappear. On the 31st it will be in the same direction as the sun. Saturn rises about 11 around Jan. 1, in Leo the lion, part of which is shown on our maps low in the east. Leo is followed by Virgo, the virgin, and this group is the present location of Mars, which appears by 1 a.m. Mercury is farthest east of the sun at the beginning of the month, and remains in the sky after sunset, but it will be hard to locate. Jupiter is too nearly in the direction of the sun to be seen.

Taurus, now so conspicuous, is probably one of the most ancient of the constellations. More than 4000 years ago the sun stood in this group at the vernal equinox, the beginning of spring, but because of the slow turning of the sky, called "precession of the equinoxes," it is now in Pisces, the fishes, when that season starts. In Grecian mythology, Taurus was supposed to represent the bull into which Jupiter turned himself to carry Europa over the sea to the continent that now bears her name.

Dust Surrounds Pleiades

The little cluster of stars in the bull's shoulder called the Pleiades has several other names. Sometimes it is erroneously called the little dipper, because the stars are arranged something like a dipper. Another popular name has been the meat cleaver. Like Taurus, the Pleiades are famous in mythology. They were the seven daughters of Atlas, their mother being the nymph Pleione. Their names were Alcyone, Merope, Celaeno, Taygeta, Sterope, Electra and Maia, and these same names are given

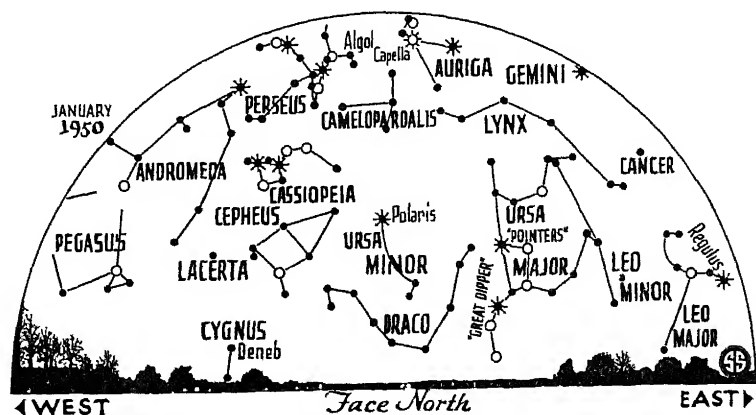
to the brighter stars in the cluster. In addition, the names of their parents are also given to two of the stars, making nine that have names, and these are doubtless the faintest stars in the sky to which proper names have been applied. It is hard to see all nine with the naked eye, and only six are ordinarily visible.

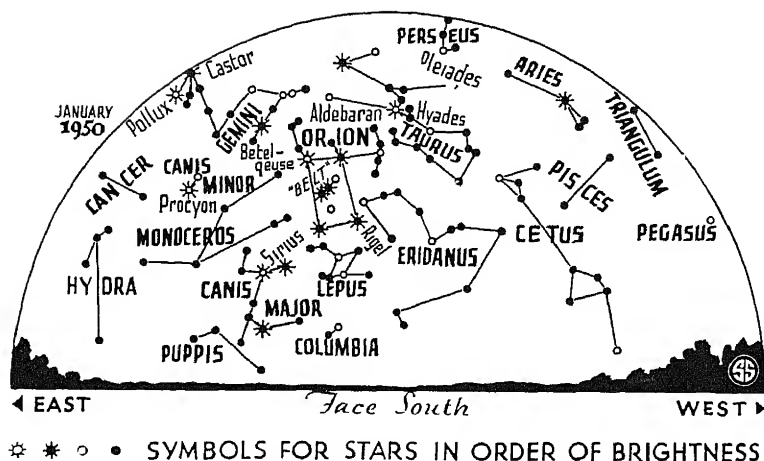
Through a small telescope this cluster forms a remarkable sight, as dozens of stars are then seen. The entire group is surrounded by a faint nebula, not visible even with a telescope, but which shows up on astronomical photographs. This seems to be a vast cloud of cosmic dust through a wide region of space, of which parts are made to shine by the light from nearby stars.

Perseus Near Pleiades

Another interesting star seen in January is in the figure of Perseus. This group has somewhat the shape of two fish hooks. One of the hooks, which marks the foot of Perseus, almost reaches to the Pleiades, and passes near the star Algol, one of the best-known of variable stars. Its name comes from the Arabic "al Ghul," meaning "the demon," making it rather peculiar, for the Arabs rarely gave uncomplimentary names to the stars.

Though only the brighter is visible, Algol is really two stars—a bright and a faint one revolving around the center of gravity of the pair. Every two days 21 hours the faint star partially eclipses the brighter, causing it to appear considerably fainter than usual. In the astronomical time table following this article are given the times of minimum light. It takes about 10 hours to go down and come back to normal brilliance. The faint star is not really dark, as we know by the fact that there is a slight reduction in light when it is eclipsed by the bright member. The system normally shines with the combined light of both,





the bulk of the light coming from one only

Time Table for January

Jan	EST	
1	6 00 a m	Mercury farthest east of sun
3	1 00 a m	Earth nearest sun, distance 91,445,000 miles
4	2 48 a m	Full moon
8	11 53 p m	Moon passes Saturn
10	5 08 a m	Moon passes Mars
11	5 31 a m	Moon in last quarter
13	1 00 a m	Moon nearest, distance 225,700 miles
	2 15 a m	Algol at minimum

16	11 04 p m	Algol at minimum
17	noon	Mercury between earth and sun
18	2 59 a m	New moon
19	8 37 a m	Moon passes Venus
	7 53 p m	Algol at minimum
22	4 42 p m	Algol at minimum
25	5 00 p m	Moon farthest, distance 251,200 miles
	11 39 p m	Moon in first quarter
31	2 00 a m	Venus between earth and sun

Subtract one hour for CST, two hours for MST, and three for PST

Science News Letter, December 31, 1949

GENERAL SCIENCE

Vogt's Stand Costs Job

► URGING birth control as a means of reducing populations and therefore conserving a nation's natural resources has cost a man his job

The man is William Vogt who has been chief of the Pan-American Union's conservation section since 1943. In that position, Mr. Vogt studied soil and other conservation problems in Latin America and advised the governments of those nations on resources and conservation problems. His work has been internationally recognized by fellow scientists.

Last month Mr. Vogt quietly resigned from his post at the Pan-American Union. Digging into the situation, Science Service found the following facts:

1 Mr. Vogt had been told last July to cease his literary activities. This followed publication in the Saturday Evening Post of his article on weaknesses of President Truman's Point Four Program.

2 A year earlier, in May or June, 1948, Ambassador Felix Nieto del Rio of Chile had voiced objections before the Pan-American Union's governing board to parts of Mr. Vogt's book "Road to Survival" following their publication in Harper's Magazine. (An embassy spokesman, in the absence of Ambassador del Rio who he said is out of the country, said the objection was not to Mr. Vogt's scientific observations

but to his political references. The ambassador felt, said the spokesman, that Mr. Vogt should make a choice either "continue to propagandize or leave the Union.")

3 Dr. Alberto Lleras, Secretary General of the Pan-American Union, declined to comment on the assertion that Mr. Vogt had been muzzled, saying, "There seems no reason to issue a statement. Mr. Vogt knows why he submitted his resignation. He did so voluntarily. I did not ask him for it."

4 Another official of the Pan-American Union, who refused to allow use of his name, stated that the question had arisen "whether you can appropriately work for an international organization and at the same time write popular articles which criticize member governments."

In his book and other writings Mr. Vogt has bluntly charged that governments in Latin America as well as throughout the world have failed to handle their problems of reducing populations and conserving natural resources. He contends that unless steps are taken to check the growth of population, there will never be enough food and other resources, no matter how carefully they are conserved.

Mr. Vogt himself when asked to comment said, "As far as I am concerned, there is no controversy between me and

the Pan-American Union.

"I would prefer to tell you about my new book," Mr. Vogt said. It will be about "how the Scandinavians have come to terms with their environment. It will be a sort of sequel to 'Road to Survival,' answering some of the questions raised there," he said.

When his present researches on it are finished, he plans to go to Europe next year to gather further material for the book.

Science News Letter, December 31, 1949

MEDICINE

Pattern of Diabetes Heredity Explored

► A TENDENCY, or predisposition, to diabetes is inherited through a single recessive gene, Dr. Aithui G. Steinberg and Russell M. Wilder of the Mayo Clinic reported at the meeting of the American Association for the Advancement of Science.

A gene is a unit in the chromosome which carries a hereditarily transmissible character.

When both parents are diabetic, every one of their children is a potential diabetic, the Mayo scientists stated. Half the brothers and sisters of a diabetic person are potential diabetics if one parent is diabetic, and one-quarter of a diabetic's brothers and sisters are potential diabetics if neither parent is diabetic.

The report, the doctors stated, is preliminary and based on the first 422 case histories which have been collected. The study was undertaken to clarify the nature of the hereditary pattern in diabetes, which has been a matter of "considerable disagreement." Because the disease starts at a "variable and usually late age," the doctors pointed out, the "possibility of prevention is great."

The age of a diabetic parent at the time the diabetes started does not influence the age at which the diabetes will start in diabetic children.

The disease is more frequent, the doctors found, in children of lower birth order, that is the first born children, than among those of higher birth order.

If neither parent of a diabetic is diabetic, about 6% of the diabetic's brothers and sisters have the disease. If one parent is diabetic, about 12% of the brothers and sisters of the diabetic have the disease.

Science News Letter, December 31, 1949

The U. S. Bureau of Mines has several minerals reference "libraries" containing drill-core samples of ore and records of each sample; these specimens are cylinder-shaped, being bored out of the earth with hollow drills.

The new roof on the U. S. Capitol at Washington contains a two-inch insulation of "glass" in the form of a special type composed of millions of tiny glass cells filled with air.

AGRICULTURE

Better Farming Is Possible

➤ AMERICA'S abundant farm production can be boosted still further by placing the new crops and new techniques that research has unearthed into the hands of the farmers.

Agricultural research has developed many improved crops and more efficient methods that are still not widely used, said Robert M. Salter, chief of the Bureau of Plant Industry, Soils, and Agricultural Engineering, in his annual report.

One of the best ways to get this knowledge out to the farmers, he found, is the establishment of pilot farms in farming districts. The farmers can then see for themselves how practical or profitable the innovations are.

Improved use of the soil through modern

methods of soil classification is one of the technical achievements which has not been applied on anything like the scale that it should, he pointed out. Soil classification permits the farmer to predict accurately whether a crop grown experimentally elsewhere would grow successfully on his fields.

To the pool of past technical achievements, government scientists are constantly adding new knowledge. He cited, for one example, the discovery after a 50-year search of a sugar beet that produces single seeds. With the present seed clusters, it is necessary to wait until the plants begin coming up and then thin out the excess plants by hand. Now that a single-germ seed type has been developed, scientists are working on a commercial variety which will combine

with it the other desirable qualities.

Other new developments of promise: cultivation of an imported plant called red squill from which a rat poison can be made that is harmless to other animals; use of 2,4-D as a spray on apples to prevent them from dropping; the importation of about 10,000 different plants to be tested for their usefulness in this country; and dozens of other investigations of farm activities ranging from food crop raising to farm electrification and farm machinery.

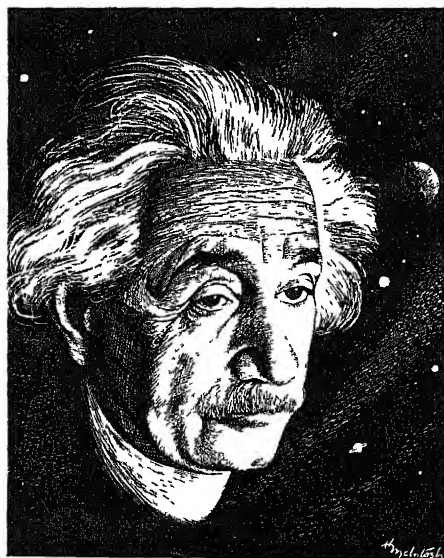
Science News Letter, December 31, 1949

● RADIO

Saturday, January 7, 3 15 p.m., EST

"Adventures in Science" with Watson Davis, director of Science Service, over Columbia Broadcasting System.

Dr. Dean Burk, National Institutes of Health, Public Health Service, Bethesda, Md., will talk about "Future Energy from Photosynthesis."



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SC



Guardians of the Snow

➤ CONIFER trees and snow always seem to belong together

However, conifers are by no means confined to the lands of snowy winters, but so ineradicable is the picture of snow-surrounded evergreens that when Rudyard Kipling wanted to pack the geographical grandiosity of the British Empire into a single phrase, he wrote of "dominion over palm and pine"

Although it is true that the coniferous trees can be found in lands that reach toward the sun (in our own South, they dispute dominion with at least one kind of palm!), nevertheless they do belong first to the North. Or perhaps it would be more proper to say that the North belongs to them. They circle the boreal end of the earth like a dark-green garland. They

are the last trees that look upon the desolate tundras that run to the Arctic sea. Willows and poplars and birches push toward the North, too, but they surrender and dwindle to bushes, while the spruces still stand up as trees.

Incidentally, Kipling limited the northern extent of his Empire unnecessarily (though probably quite unconsciously) when he made the pine the symbol of the North. Spruces run far to the north, beyond the last of the pines, just as the pines leave the spruces behind in their southerly extension. Their ranges overlap, but it is the spruce that in general stays within the circle of deep annual snow.

There is good reason for that, for the snow is more necessary to the spruce than it is to the pine. Some of the evergreens—and pine and juniper are outstanding among them—can stand a good deal of drought. Not all kinds of pine, but there are enough dryland pines to make good forests in lands where the slow seep of melting snow never figures as a source of ground water.

Not so the spruces, however, nor yet their cousins the firs. They are rather more particular than most pines, and seek the more moist regions. Where they grow in competition with pines, the spruces and firs cling to the shady, damp sides of ravines. Lands that they dominate are usually found to be perennially moist. In part, these conifers attend to that themselves, for their dense foliage makes a superior shade for the snow that lies under their canopy, holding it against the ardor of the spring sun and permitting it to melt only slowly—and to the advantage of their roots.

(Reprint from SNL, Jan 4, 1936)

Science News Letter, December 31, 1949

PSYCHOLOGY

Women Rely on Sight

➤ WOMEN put more reliance in what they see than in what they hear or feel when they have to decide something through the use of these senses.

That "women are more affected by the nature of their surroundings" than men is the conclusion drawn by Dr. H. A. Witkin, department of psychology, Brooklyn College. He subjected men and women to tests centering a rod in a frame, putting a tilted room upright, measuring body sway and finding hidden figures.

From these tests he found women rely less on impressions from their bodies than men. Although many persons were tested, Dr. Witkin found his averages using approximately 250 women and 135 men for the tilting room and rod and frame trials, and about 50 of each sex for the body sway and hidden figures tests.

To tell how a person judges the upright no matter in what position his body is and no matter how the surroundings appear, Dr. Witkin uses a small room within

which is a chair. Either the room or the chair may be tilted to any degree left or right from inside or outside the room. They may be tilted alone or together, to the same side or opposite sides, and at the same speed or different speeds.

Since nothing outside of the room can be seen by a person taking the test, the object is to bring either the chair or the room to an upright position. In some instances Dr. Witkin found that the room could be tilted as much as 56 degrees, yet be considered vertical by some.

In one series of trials, where room and chair were initially tilted to the same side, men on the average saw the room as straight when it was tilted 115 degrees. Women, however, thought it was straight when it was tilted 177 degrees on the average.

Reason for the differences in perception brought out by the tests is due to differences in personal characteristics between men and women, Dr. Witkin believes. He is making

an intensive personality study of many men and women also taking the perception tests. They include a normal group selected from among students at Brooklyn College and an abnormal group, patients at a mental hospital in the state. Dr. Witkin is also making a study of the perception of children at different ages. Collaborating with him in his work are Dr. S. Warner, Clark University, Dr. P. Bretnall, Brooklyn College, Dr. M. Hertzman, City College of New York, K. Machover, Kings County Hospital, New York City, and T. Leventhal.

Science News Letter, December 31, 1949

BIOLOGY

Algae, "Plus" and "Minus" Sexes, May Aid Food Study

➤ A TINY plant with two sexes which are so much alike they are called "plus" and "minus" may help science to understand how green plants manufacture their food by photosynthesis, said Dr. Ralph A. Lewin of Yale University before a meeting of the American Association for the Advancement of Science.

The plant is the one-celled, free-swimming alga, *Chlamydomonas*. It goes through its reproductive cycle in as little as nine days, which makes it a favorable subject for genetic study, Dr. Lewin said.

By inducing mutations, or hereditary changes, with radiation, ultraviolet light or other means, and then comparing a mutant with the normal type, Dr. Lewin suggested that "From their differences (they can) learn much about the process of photosynthesis."

The two "sexes", plus and minus, are not distinguished by any visible character except by their mating behavior. The difference might be said to be psychological," he said.

Science News Letter, December 31, 1949

Words in Science— Absorption-Adsorption

➤ THE two words absorption and adsorption are often confused just because of the appearance of the words in type is so similar. The meaning is somewhat different.

Absorption is the taking up or up of a liquid or a gas as a sponge soaks up water.

Adsorption is the process of sticking to the surface rather than penetrating it, as with absorption. Gases sometimes adhere to solids by adsorption. This is the basis of the gas mask. The poison gases are adsorbed by the charcoal contained in the mask, the charcoal being finely pulverized so as to present an enormous surface to the poison gas.

Science News Letter, December 31, 1949

Books of the Week

TO SERVE YOU To get books, send us a check or money order to cover retail price. Address Book Dept., SCIENCE NEWS LETTER, 1719 N St., N W Washington 6, D C. Ask for free publications direct from issuing organizations.

THE ADVANCEMENT OF SCIENCE—*British Association for the Advancement of Science*, 130 p, illus, paper, six shillings. Addresses delivered at the annual meeting of the BAAS in Newcastle upon Tyne, August 31 to September 7, 1949.

APPLIED PRACTICAL RADIO-TELEVISION—Coyne Technical Staff—*Coyne Electrical & Radio-Television School*, 392 p, illus, \$4.25. Covers practical procedures with a chapter on color television. For radiomen interested in getting into television.

THE AXONOMETRIC METHOD OF DESCRIPTIVE GEOMETRY—William Henry Roever—*Edwards Brothers*, 75 p, illus, paper, \$3.00. For those interested in pictorial representation of the objects of space upon a plane.

DECAY OF TIMBER AND ITS PREVENTION—K. St. G. Cartwright and W. P. K. Findlay—*Chemical*, 294 p, illus, \$7.50. A reference book dealing with the problems of timber decay and preventive methods.

THE CHILDREN'S BOOKSHELF: A Booklist for Parents—Federal Security Agency—*Gov't Printing Office* (Publ. N 304), 41 p, illus, 15 cents. A list of a few books of each year, grouped into classes with references to children's interests and to their varying levels of development.

MACHINERY'S HANDBOOK—Erik Oberg and Franklin D. Jones, Eds.—*Industrial Press*, 1911 p, illus, \$7.00. A basic reference containing data and formulas for use in either designing or building any type of machine or other mechanical device.

INTELLECTUAL APTITUDE TEST (series A) For Grades 7-10—Harvey S. Whistler and Louis M. B. C.—*California Test Bureau*, 23 p, illus, \$3.00. (I. B. M. cards four cells.) Provides a diagnostic analysis of po-

tential ability in the field of music. Given directly from a piano keyboard.

A NEW ADIAPHORINE LITHIUM AND ASSOCIATED MAMMALS FROM A DIVERSED FAUNA IN MENDOZA, ARGENTINA—George Gaylord Simpson and Jose Luis Minoprio—*American Museum of Natural History*, 27 p, illus, paper, 15 cents. A brief description of a few fossil mammals.

A NEW OLIGOCENE RODENT GENUS FROM PATAGONIA—Albert E. Wood—*American Museum of Natural History*, 54 p, illus, paper, 15 cents. A report on two nearly complete and largely articulated rodent skeletons.

ORGANIZATION AND SUPERVISION OF ELEMENTARY EDUCATION IN 100 CITIES—Federal Security Agency—*Gov't Printing Office*, 84 p, illus, paper, 25 cents. An analysis of a study made by staff members of the Division of Elementary Education.

REPORT OF PROCEEDINGS—Advisory Council on Industry-Science Teaching Relations—*National Science Teachers Association*, 24 p, paper, free upon request to publisher, 1201 16th St., N W, Washington 6, D C. Addresses presented at the regional conference in Pittsburgh, Pa., September 30, 1949.

SOILS: Their Physics and Chemistry—A. N. Purdy—*Reinhold*, 550 p, illus, \$7.00. The author presents his views of the structure and chemical behavior of soils.

X-RAY TREATMENT: Its Origin, Birth and Early History—Emil H. Grubbe—*Bruce*, 153 p, illus, \$3.00. The author presents his views upon the origin and birth of X-ray therapy.

YOUR FARMHOUSE HEATING—United States Department of Agriculture (Misc. Publ. No. 689)—*Gov't Printing Office*, 23 p, illus, paper, 15 cents. A technical report.

Science News Letter, December 31, 1949

to planes, and the installation of very high frequency radio ranges to guide pilots across country.

Neither the instrument landing system, developed and advocated by the Civil Aeronautics Administration and known as ILS, nor the radar-radio Ground Control Approach (GCA) pushed by the military was deemed adequate alone by the RTCA. The plan devised for immediate use combines both.

The very high frequency (VHF) radio range proposed sends static-free communications to pilots. With this omnirange, as it is called, a pilot can fly a radio course to or from any station with relatively simple and inexpensive equipment in his plane. Also the pilot may have in his cockpit an instrument that will tell him continuously in miles how far he is from the station to which he is tuned.

Science News Letter, December 31, 1949

ASTRONOMY

Explosion on Star Puzzles Astronomers

► ASTRONOMERS are pondering the significance of a violent explosion which they observed by pure chance on a cosmic neighbor of the sun.

The speculation of University of California astronomers at Lick Observatory, Mt. Hamilton, Calif., is that the phenomenon may be a mechanism of nature similar to the release of atomic energy.

Dr. and Mrs. Gerald E. Kron, of the astronomical staff, observed the explosion while they were doing routine work with photo-electric equipment attached to the observatory's 36-inch telescope.

In the space of 15 minutes the star flared to twice its normal brightness and then returned to near normal brightness. The star, known as Cin 20 1224, is not a nova, or exploding star. It is actually fainter, redder and smaller than the sun, which is a rather ordinary star.

Dr. and Mrs. Kron's calculations indicate that only a small spot on the star was involved in the explosion. This spot probably had a diameter about equal to that of the earth.

The whole star has a diameter about 60 times that of the earth. The astronomers calculated that in order to cause a two-fold increase in light received from the star, the amount of light emanating from the affected spot must have increased 2000 times, its temperature rising from 5,000 degrees to 20,000 degrees Centigrade.

A similar flare-up was recently observed by Dr. W. J. Luyten, of the University of Minnesota, who found such a phenomenon on a photographic plate, and this is the fourth of the sun's neighbors known to flare up. The star observed by Dr. and Mrs. Kron was the first of this type to be observed and carefully measured during the actual act of flaring up.

Science News Letter, December 31, 1949

AERONAUTICS

Trophy to Commission

► THE highly-prized Collier Trophy, America's number one aviation award, will go this year to a government commission, rather than to an individual. The Radio Technical Commission for Aeronautics will receive the trophy from the President of the United States on Jan. 10, 1950, the presentation being in the executive offices of the White House.

This commission, known as RTCA for short, is receiving the trophy for developing a system of air navigation and traffic control now officially adopted for American use by the U. S. Civil Aeronautics Administration, the U. S. Air Force and the Navy. Facilities for its use are being rapidly installed. It will probably become international in the near future.

The RTCA, a cooperative association of all government agencies and industry or-

ganizations concerned with aeronautical telecommunications, in developing its plan had to reconcile the policies and ideas of seven government agencies, including the Air Force, the Navy and five civil organizations. All these are directly concerned with air traffic problems.

It is the first time in aviation history that the military and civilian aviation leaders, as well as government regulatory groups, have reached general agreement on the over-all system of navigation and landing aids which all believe should be developed and installed in the United States.

The system of air navigation and traffic control to facilitate safe and unlimited aircraft operations under all weather conditions includes the use of an instrument landing system, radar-radio ground control approach apparatus, the use of very high frequency in radio communications

• New Machines and Gadgets •

For addresses where you can get more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., Washington 6, D C and ask for Gadget Bulletin 497 To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription

✿ **POCKET-HEATER**, the size of a thin cigarette package, generates an even temperature of 125 degrees Fahrenheit for 24 hours on just one filling of ordinary lighter fuel, it is claimed Vapor from the fluid passes through a heating element, producing the 125-degree temperature without a flame

Science News Letter, December 31, 1949

✿ **PROTECTOR** for the bottom edges of trousers is a flat guard-plate which is fastened to the lower edge of the cuff by means of pointed prongs pushed through the cloth to engage a plate within the cuffs This device, recently patented, can also be used on cuffless trousers

Science News Letter, December 31, 1949

✿ **HOLDER** for cut flowers is made of a sponge-like plastic, is about the size and shape of a cupcake, and has an adhesive base to keep it in position in a bowl. When flowers are jabbed into the sponge, they remain as placed and are kept fresh by water covering the moss-colored holder

Science News Letter, December 31, 1949

✿ **"FLYING SAUCER"** for the youngster, shown in the picture, can be thrown, skipped or boomeranged because the device is so precisely engineered that it actually glides through the air, it is claimed It is molded of a tough plastic which will with-



stand rough usage, and it is available in various colors

Science News Letter, December 31, 1949

✿ **CHECKWRITER**, small enough to fit into a checkbook or pocket, makes large figures, indelibly perforated and inked into

the fiber, showing the exact amount of the check in dollars and cents Its use insures protection against any check alteration

Science News Letter, December 31, 1949

✿ **POULTRY-FEEDER**, an endless belt type operated by an electric motor and set in motion 16 times during the feeding day by an electric clock, brings grain along its trough-like bottom for a brief eating period and returns left-overs to the bin Grain from a storage bin is loaded automatically to the feeder

Science News Letter, December 31, 1949

✿ **PROTECTIVE PLATE**, easily attachable to the inside or outside of any door gives the dog something to scratch when he wants to get in or out without marring the door itself The plate is made of plastic, and has a corrugated surface which gives off an audible sound when pawed

Science News Letter, December 31, 1949

✿ **ILLUMINATION RECORDER** is a instrument that gives a continuous record of outdoor daylight by means of a photoelectric cell placed in the open air with unobstructed exposure to the sky An indoor recorder measures the electrical output from the photoelectric "eye."

Science News Letter, December 31, 1949

Do You Know?

Copper is said to be the oldest metal of commerce

Calcium chloride, especially prepared for the purpose, is used in treating coal to keep it dustless

The area of the United States is approximately 1,905,000,000 acres, not including sizable rivers and lakes

The common female firefly of the west coastal area is wingless and is seen on the ground, not in the air; the male has wings but is not luminous

Many soil maps of the present time are made from aerial photographs to which are added lines showing soil boundaries and detailed soil information

Petroleum from Alberta, Canada, will reach the region of the Great Lakes in a quantity of some 100,000 barrels a day by a pipeline now under construction which will be completed in about two years

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